THE POLAR TIMES

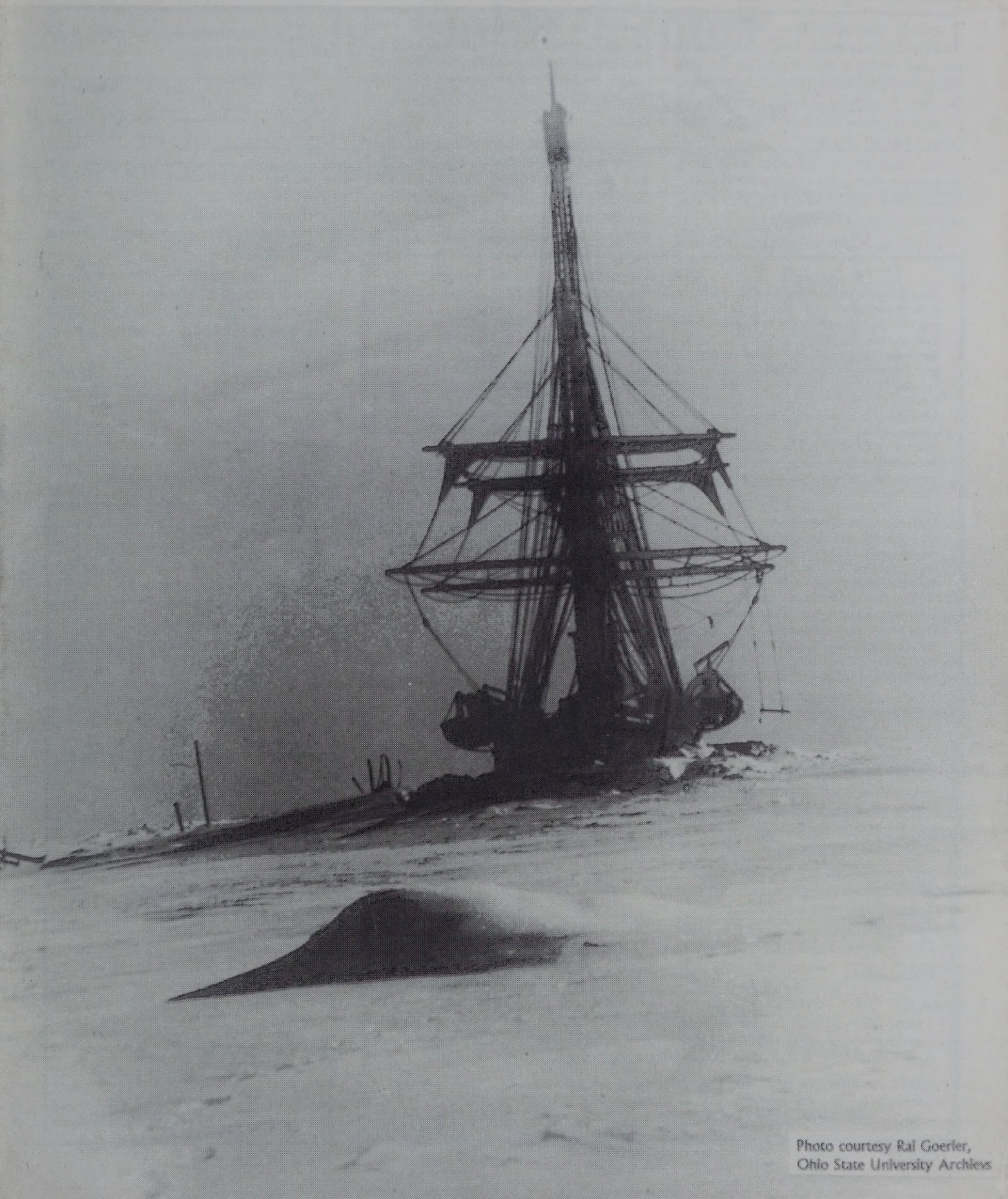

Photo courtesy Ral Goerler,
Ohio State University Archives

Secretary's Letter

I want to thank all of those who have contributed to this issue. Our cadre of clippers and writers is growing led by the venerable Peter Barretta who both clips and writes. We have enough good articles to put out a 50 page magazine and had difficulty cramming it all into 24 pages.

For those who do write for publication, please keep your articles to about 500 words. Succinctness and pithiness are keys to getting your theme into print.

If you have Email we prefer that you send your articles over the web. This way I will be able to pare it down on the computer and then email it to Charlotte Sinclaire, who formats it properly before emailing it to Della Weston who selects the articles and does the layout.

Please note our address change. We have not moved - only changed our Post Office from Reedsport to Lakeside where I live. Both addresses will be active through mid August and then all first class mail will be forwarded to Box 87, Lakeside, OR 97449.

Again thanks to all who contributed. Keep those articles coming.

Sincerely

Brian Shoemaker

CONTENT

Belgica Expedition Centennial—1897-1997 ... 3
International Geophysical Year ... 3
Leaner Budgets Curtail Plans for South Pole .. 4
Oral Histories ... 4
Norwegian Completes First Solo Crossing ... 5
Solo Sailor Saved; Rescue Was 'Incredible' ... 6
Moonlight Can Heat North, South Poles ... 6
Spewing Fountains of Gas High Above Poles.. 7
Iceland Awaits Floods ... 7
Auroras in Daylight? ... 7
Probing the Aurora ... 7
Rising Temperatures ... 8
'Hurricanes" Sweep Across Ocean's Floor ... 8
Polar Auction in London ... 8
Explorer of Poles Shares Her Zest for Life ... 9
Arctic Trekker Tells of Narrow Escape ... 9
US Officials Suspect Russia Staged Tests ... 10
Secession Could Split Quebec ... 10
Northern Ozone Hole Reported ... 10
Greenland Rock Reveals New Theory ... 10
To South Pole by Motor Car ... 11
Navy Submarine Has Duty in Arctic ... 11
Thaw in U.S., Russia Relations ... 12
Naval Support Force Returns to Homeport ... 12
Tundra Leak ... 12
Colossal Iceberg May Last 10 Years ... 13
New South Pole Observatory Opens ... 13
Ice-Cream on Ice ... 13
Juvenile Penguins Go Beyond Safe Area ... 14
Study Backs Mars Meteorite Theory ... 15
Skeptic Says Life on Mars Unlikely ... 15
Arctic Nations Band Against Pollution ... 15
Photochemical Reaction in Antarctic Waters 16
Antarctica's Four Poles ... 16
Ex-Antarctic Sailor Joins the Penguin Family 17
Arctic-Like Ocean Found on Jupiter Moon ... 17
President Signs Environmental Protocol ... 17
Close Quarters Make for Challenge ... 18
Russian Reindeer Starving to Death ... 18
Deicing Dynamics of Sea Life ... 18
Retrieving the Flare Genesis Telescope ... 18
Return of Antarctic Seals ... 18
Ancient Humans Survived in Arctic ... 19
Arctic Agreement on Nuclear Waste ... 19
Mardi Gras for Mushers ... 19
Snow Geese Survive All too Well ... 20
High Krill Catch Limit Worries Biologists ... 20
Milestones ... 20
Russian Rescue ... 20
Book Reviews ... 21
Obituaries ... 22
Letters & Announcements ... 23

American Polar Society

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Editor's Letter

Dear Readers,

Thanks! Thanks! Thanks for your input! We're receiving more clippings and first-hand articles all the time!

If you find something printed that you feel is in error, we will print your letter to the editor. If you have a verifiable article with another point of view, we will print it!

Thanks again! *Della Weston*

Our Cover...

Photo of *Belgica* during the Antarctic night, by Dr. Frederick Cook, 1898.

The Polar Times

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The Polar Times

American Polar Society • Spring-Summer 1997

Front Cover Story

Belgica Expedition Centennial—1897-1997

by Brian Shoemaker

The dawn of the *Heroic Age of Antarctic Exploration* was unobtrusively heralded in August 1897 as the Norwegian sealer *Patria*, rechristened *Belgica*, left Antwerp headed for the South Polar Region.

Five other European governments were planning voyages to the Antarctic at this time, but the first country to complete the outfiting of a modern scientific expedition was Belgium.

The launching of the Belgian Antarctic Expedition is a monument to the energy and persistence of Lieutenant Adrien de Gerlache who solicited private and government subscriptions totaling $60,000 to carry out the bare-boned project.

It was the first truly international scientific expedition to Antarctica, with nineteen men from five nations serving as scientists and mariners. Besides de Gerlache, Captain LeCointe served as Executive Officer and Hydrographer; Roald Amundsen, launching his polar career, served as First Mate; Emile Danco was the expedition Magnetician; Emile Racovitza, a Rumanian, was the Naturalist; Henryk Arctowski, a Pole was Oceanographer/Meteorologist while Antoine Dobrowolski, a Pole served as his assistant; and Dr. Frederick Cook, an American, served as Surgeon, Anthropologist and Photographer. The crew, 12 men were half-and-half Norwegians and Belgians.

Although they suffered many hardships and two men died, the expedition was successful in many aspects. It was the most noteworthy scientific expedition, to that date, to have visited the Antarctic, carrying out the first year-round observations in all of the above disciplines. It was the first to winter-over. Significant geographic discoveries were made around what is today the Gerlache Strait which many consider the most beautiful part of Antarctica.

Dr. Cook's photographs were the first photographs of Antarctica that were made available to the world public.

Techniques for work and survival were first developed on this expedition. They pioneered travel overland man-hauling sledges and were the first to travel by ski. They froze their ship into the winter ice and used it as a base of operations. By necessity, they learned to live off of the Antarctic wildlife in order to stave off the effects of scurvy.

Many of the crew went on to other achievements; Amundsen discovered the Northwest Passage and the South Pole; Cook the first to claim discovery of the North Pole and Arctowski a distinguished scientific career.

Upon their return de Gerlache served as an advisor to the British (Scott), Germans (Drygalski), Swedes (Nordenskiold), Scotland (Bruce) and French (Charcot) expeditions which were launched in 1902. *The Heroic Age of Antarctic Exploration* had begun.

(The Byrd Polar Research Center will be hosting a Centennial Symposium on the Belgica Expedition on September 5-6, 1997. The public is cordially invited. See Announcements p. 23 for details.)

Back Cover Story

International Geophysical Year

by Brian Shoemaker

July 1st marks the 40th anniversary of the International Geophysical Year, the most ambitious and comprehensive scientific assault on the polar regions ever undertaken. Its scope was international and political differences were set aside in the cause of advancement of science.

Originally the IGY was conceived to last from July 1, 1957 until December 31, 1958. However, at both poles researchers from the field offered compelling reasons of the need for mankind to continue polar field programs ad infinitum as an integral part of understanding the earth's ecosystem.

Key to the approval of budgets for continuing these programs after the IGY termination date was the quality of science in the early days. A tribute to the success in the field during that time are the programs and institutions that have developed since IGY to further advance polar research.

Many played a role during IGY, but scientific leadership in the field was critical. Two men stand out as symbols in this respect - Bert Crary in the South and Norbert Untersteiner in the North featured on our back cover.

Dr. Crary was Chief Scientist during IGY in the Antarctic. As such he set the standard for high quality research while working in a hostile environment. Field science programs in Antarctica today stand as a living legacy to Bert's leadership during the IGY.

When the National Academy of Sciences was contemplating setting up ice stations in the Arctic Ocean during IGY they imported a researcher from Austria to lead the program, Dr. Norbert Untersteiner. Dr. Untersteiner pioneered the methodology and techniques for conducting research from drifting ice floes on a year-around basis. Multi-disciplinary field science programs from moving ice in the Arctic Ocean today are a tribute to his pioneering efforts during IGY.

In a sense the IGY lives on and the science continues thanks to the many Bert Crarys and Norbert Untersteiners who led the way in 1957-58. ❑

Leaner Budgets Curtail Plans for South Pole

***The New York Times*, 15 April 1997, p. B9, by Malcolm W. Browne (cb Calvin Larsen)—** As the green parkas worn by United States Navy men and women in Antarctica are rapidly replaced by the red parkas of civilians, major changes in American Antarctic operations are taking place, driven by leaner budgets, safety concerns, the end of the cold war and new scientific priorities.

Although it is only 23 years old, America's South Pole Station is sinking under the ice and warping under the pressure of drifting snow and ice crystals. Mounting problems with sewage disposal, garage space, electricity generation, fuel storage, fire prevention and a host of other things have convinced experts that the station needs to be replaced. But the earliest the station could be replaced, even if work began in the next summer season, is 2005.

To restore South Pole Station to a safe condition by 2005 is urgent and requires a large investment, independent analysts agree, and the money may have to come partly out of Antarctic budgets for research on ozone depletion, global warming, ice sheet melting, the birth of stars in distant galaxies and the search for extraterrestrial life.

So the National Science Foundation—the Federal agency that directs United States operations in Antarctica—is seeking ways to slash the cost of research on the Ice.

One way will be to reduce the time scientists actually spend on the continent. Agency officials expect to continue supporting most active research in Antarctica, but they will encourage scientists to stay home, perhaps for one year out of three, to do their deskwork and computer analyses.

By transferring most navy operations to civilian contractors in the next two years, the agency expects to save some $30 million. But a saving that will be less welcome to many scientists will be a projected reallocation of $20 million in research funds, to be achieved mainly by reducing the overall number of scientists working in Antarctica in the next five years.

The 23-year-old dome at South Pole station, meanwhile, is settling ever deeper into the two-mile-thick ice sheet and posing many safety and operational hazards. The science foundation plans to dismantle it and ship it back to the United States, erecting in its place a pair of horseshoe-shaped residential and office buildings expected to cost about $120 million. They will be mounted on stilts to prevent the accumulation of drifting show around their bases—a major problem with the old dome.

Dr. Cornelius W. Sullivan, the marine biologist who has headed the foundation's polar programs since 1993, believes that his agency will win the approval of Congress for financing the new South Pole Station at the Amundsen-Scott Base as well as preserving the other two permanent American stations in Antarctica: McMurdo Station on Ross Island, and Palmer Station, near the tip of the Antarctic peninsula. Last Thursday, he summarized the program's needs at a Congressional hearing before flying to Christchurch, New Zealand, for talks with his counterparts from Britain, New Zealand, and South Africa about cooperation on logistics and ways to cut costs in Antarctica.

To lend support to the cause of Antarctic research, Secretary of State Madeleine K. Albright recently added her signature to an open State Department letter that said" Maintaining an active and influential United States presence in Antarctica serves important strategic and foreign policy objectives. This presence in Antarctica gives us a decisive voice in the Antarctic Treaty system, which is the basis for the peace and stability of the area." The letter was sent to Norman R. Augustine, chief executive of the Lockheed Martin Corporation and head of a panel of experts who recently assessed the needs of America's Antarctic program.

To date, 43 nations have established bases in Antarctica under the Antarctic Treaty, but even though scientific relations between them are harmonious, seven nations—Argentina, Chile, Britain, France, Norway, New Zealand and Australia—have longstanding and conflicting claims to Antarctic territory. These claims are held in indefinite abeyance by the treaty, but they have never been relinquished. United States stations are by far the most populous on the continent, and American influence is regarded as an important factor in keeping the peace.

Every dollar the National Science Foundation can save for rebuilding and even if large savings are realized, the foundation might have to close Palmer Station for several Antarctic winters. Palmer is the smallest of the three stations, but it is especially important for marine biologists because of the rich variety of birds and sea animals around it.

While scientists in Antarctica will feel a sharp financial pinch in the next few years, the navy presence will be virtually eliminated.

The Navy, which built McMurdo station in the mid-1950s and has provided logistical support for all United States Antarctic operations ever since, including C-130 transport flights, has already begun to leave. In 1998, the 109th Wing of the New York Air National Guard will begin flying the small fleet of ski-equipped C-130 planes that are the backbone of South Pole logistics; the shift from the Navy to the National Guard is expected to save $30 million a year.

When the Southern Hemisphere spring arrives next August, flights to Antarctic bases from the outer world will resume, ending Antarctica's usual winter isolation. The Navy contingent in Antarctica will then be reduced to fewer than 300 men and women; its peak in earlier years was 1,200.

Some Navy men and women said they were saddened by the departure of their service, which has played an important role in Antarctic exploration and settlement since the 19th century, including the landmark expeditions in the 1920s and 1930s by Adm. Richard E. Byrd.

But Brian H. Shoemaker, a retired Navy captain who commanded the Military support force in Antarctica from 1982 to 1985, said he had no regrets about the changes.

"Times change," he said, "and although sailors feel nostalgia for Antarctica, the Antarctic program will do fine without the Navy."

Military men are trained "to maintain peace by being prepared for war," he said, "but in Antarctica, it is different. We maintain peace in Antarctica by practicing peace. No military people in Antarctica have guns, but although we are unarmed, we keep the peace. Throughout the Cold War, we and the Russians made common war on the cold, setting an example for international disarmament that was emulated in other arenas of potential confrontation. Peace will prevail in Antarctica." (See "Naval Support Force," p. 12) ❑

Oral Histories

We are carrying obits of six Old Polar Explorers in this issue including three members of our Board of Governors. It is always sad, but sadder still if we have never taken their oral histories. When this happens we have little to remember them for and collectively we all lose part of our heritage of polar exploration.

Leverett Byrd and I have been taking oral histories from members on an occasional basis when we travel - he in New England and I on the West Coast and in Colorado. We find it to be a pleasurable experience to sit down with an explorer from the 20's, 30's, 40's and get their life in the field on tape.

I had the honor of completing an oral history on Gordon Fountain at his home in Oakland last October. Gordon was a sailor on the *Bear of Oakland* with Admiral Byrd in 1933 and was a charter member of the American Polar Society.

His story sheds new light on sailing in ice covered seas back then and adds to the understanding of shipboard life during that era.

He died recently (see obits) and, although sad, I feel smug that we have recorded his story and saved a little bit of our polar heritage. Unfortunately no one has taken the histories of the others who have died.

Anyone can do an oral history. You aren't faced with the daunting task of writing - just learning some basics about interviewing and working a portable tape recorder. Then make an appointment by telephone with the subject and interview him in his home. You will be hooked after the first interview.

If you are interested interviewing someone in your area, please contact me by phone, fax, Email or by writing.

Sincerely

Brian

Exhausted Norwegian Completes First Solo Crossing of Antarctica

Associated Press

Boerge Ousland pushes to the finish line Saturday after a 64-day solo crossing of Antarctica (AP Photo)

***Associated Press*, 18 Jan 1997 (date approximate), by Geoff Spencer (cb Billy-Ace Baker)**—For 64 days, Boerge Ousland saw little more than white. Endless fields of packed snow, occasionally broken up by peaks and canyons of icy white. Fiercely blowing flakes at times obscured the view of his white horizon.

The 34-year-old Norwegian emerged on the Pacific edge of Antarctica on Saturday to become the first person to cross the continent alone and unaided.

Exhausted and slightly frostbitten, Ousland beat three other adventurers who set out separately on Nov. 15 to complete the 1,675-mile journey.

"I am very, very tired, but incredibly happy," Ousland said by radio.

Four New Zealanders from the Scott Base research outpost at McMurdo Sound cheered Ousland on the last three miles of his crossing.

"He was fine and happy. He had a big smile and was elated that it was over," base radio operator Rick James told The Associated Press by telephone.

The New Zealanders shook Ousland's hand and shot photographs and video footage as he skied the rest of the way unassisted to the base, home to 55 scientists and support personnel.

After reading a congratulatory message sent by fax from British rival Sir Ranulph Twisteton-Wykeham-Fiennes, Ousland ate a hot meal of pasta, meat and vegetables, went into a warm cabin and fell into a deep sleep.

Ousland beat his own prediction of how long the crossing would take—90 days—by nearly a month.

He harnessed Antarctica's fierce winds by strapping himself to a parachute-like sail. With winds in his favor, he could ski as much as 140 miles a day—all the while towing a sled carrying about 400 pounds of supplies.

"The loneliness is a positive in a way," he said. "When you're by yourself you get closer to yourself and to the surroundings."

"I feel quite good, actually," he told the Australian Broadcasting Corp. "I feel better than you would expect from a guy who skied nearly 3,000 kilometers."

Having set out from the northwestern point of Berkner Island, he reached the South Pole—roughly his midway point—on Dec. 19, and briefly met other people in his only human contact of the trip.

"The loneliness is a positive in a way," he said Saturday. "When you're by yourself you get closer to yourself and to the surroundings."

The trek included climbing the 9,800-foot South Pole plateau and enduring monotony and temperatures that dipped to minus-40s.

He spent Christmas in his tent waiting out a storm, but was cheered by reading letters from his wife and 12-year-old son and by eating a "success tart" that his wife had baked.

He maintained his strength and warmth by eating a high-fat food ration of 6,200 calories every other day. Asked how it tasted, Ousland said only, "it just gets better and better the more hungry you get."

The last miles were some of his slowest. For hours, he slogged through treacherous, crevasse-laced terrain at about 2 mph, his spokesman, Hans Christian Erlandsen told the AP in Oslo, Norway.

Upon arriving at Scott base, Ousland headed to a telephone and spent 90 minutes talking to his wife, Wenche, and supporters in Norway.

Mrs. Ousland said she was "very happy, proud and overwhelmed" that the trek had been successful. "By nature I am not afraid," she said, "but of course I have thought about everything that could happen."

Ousland attempted the crossing last year but was obstructed by frostbite.

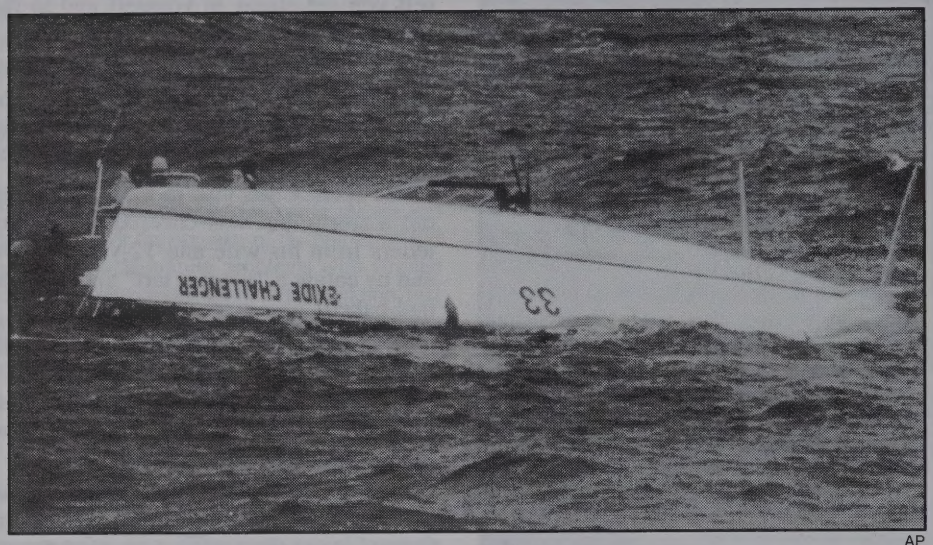
This year, three other men also started the crossing on Nov. 15. Fiennes dropped out in mid-December with kidney stones. Marek Kiminsky of Poland reported was well behind Ousland. The status of South Korean Hoe Young-Ho was unknown.

With his arrival Saturday, Ousland now holds four polar records. He and Norwegian Erling Kagge were the first pair to ski to the North Pole unaided in 1990; and Ousland did it by himself in 1993. He also is the only man to have reached both poles.

Ousland has said that going to the North Pole was more dangerous, but crossing Antarctica was more of a mental challenge because of its seemingly endless fields of snow.

"I never lost respect for Antarctica," he told Australian associated press. "It's so big and so far, you have to keep concentrating on the near future and make every day a victory." ❑

Solo Sailor Saved; Says Rescue Was 'Incredible'



AP

Tony Bullimore pops to the surface of his capsized yacht yesterday. Rescuers were preparing to cut a hole in the boat when he appeared. (AP Photo)

***The Maui News*, 9 Jan 1997, p. A12, by Peter James Spielmann (AP), SYDNEY, Australia (cb Sally Reisbeck)**—Broken and upside down, the 65-foot yacht had been battered by stormy Antarctic seas for four days, and its distress beacon had drifted away.

So when Australian navy rescuers in an inflatable speedboat reached the stranded craft today, they didn't know what to expect.

They tapped on the hull. They heard a tapping in response.

Elated, the rescuers called out, "Can you get out?"

"No," British sailor Tony Bullimore yelled back.

But just as the rescuers prepared to cut a hole in the hull, the 56-year-old sailor emerged from the 32-degree water, having swum out from under the boat. He kissed his rescuers, navy Capt. Raydon Gates said.

Bullimore had been competing in the French-organized Vendee Globe round-the-world solo yacht race. His yacht capsized Sunday about 2,000 miles southwest of Australia and 1,000 miles north of Antarctica's Wilkes Land.

Bullimore and a French sailor who also was rescued today were taken to the Australian frigate *HMAS Adelaide*, where Bullimore's first request was for a cup of tea.

Thierry Dubois is a French sailor whose yacht overturned Sunday about 70 miles from Bullimore's.

Dubois, 29, stood on the hull of his boat for 24 hours and was spotted Monday by a rescue plane that dropped him a life raft. He lived on the raft until today, when a helicopter picked him up.

The Defense Force said Dubois was suffering slight hypothermia but was generally in good condition.

The water was below 32 degrees—salt water has a lower freezing point than fresh water—and storms churned the waves up to 40 feet high. Air temperatures hovered around freezing, and winds in the area reached 70 mph.

Both sailors were wearing waterproof immersion suits, which Reynolds said helped them survive.

The rescue of the two sailors follows the Dec. 26 rescue of Raphael Dinelli, another Frenchman competing in the Vendee Globe race.

The Vendee race began in November in France. Sailors headed south down the Atlantic, dipped under Africa and were sailing south of Australia before rounding the tip of South America and returning to the Atlantic. ❑

Moonlight Can Heat North, South Poles

***The Washington Times*, 11 Jan 1997, p. A3 (cb Peter Barretta)**—It doesn't qualify as a heat wave, but it's enough to make normally reserved scientists say "Wow!" They have found that the moon can raise temperatures at the Earth's poles by about a degree.

Using data collected by satellites from Jan. 1, 1979, through Jan. 31, 1996, scientists at Arizona State University found temperatures at the North and South poles varied by close to 1 degree over a 29.5-day period, the time it takes for the moon to complete its phases.

"It was surprising....We didn't expect to find that much variation," said John A. Shaffer, lead author of the report in *Geophysical Research Letters*. "When we saw that dramatic polar region, we went 'Wow!'"

Both the North and South poles tended to be warmer during a full moon than during the new moon, he said.

"It's not exactly the same, but the pattern is the same;" for each pole, according to Mr. Shaffer, a graduate student who worked with professors Randall S. Cerveny and Robert C. Balling Jr. on the study.

Previous research by Mr. Cerveny and Mr. Balling had disclosed a monthly variation of almost .04 degree Fahrenheit for the planet as a whole during the moon's phases, due to warming by the light reflected during the full moon.

That means the polar response to the moon is 25 times stronger than the Earth as a whole, the new paper observes.

While global temperatures, and those at the equator, do not vary as much as readings at the polar areas, Mr. Shaffer said the amount of the difference was unexpected.

When the moon is full, there is a strong flow of heat toward the poles, which seems to weaken substantially during the new moon, the scientists reported.

"People argue that there isn't enough radiation from the moon to cause these big temperature differences," Mr. Shaffer said, but the difference shows up in their observations anyway.

The paper lists contending theories for the cause of the polar variation, including the moon's gravity influencing the flow of warm air, as it does the ocean's tides; moon gravity causing warming by somehow compressing air at the poles; and warming caused

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by descending air in the clear, high-pressure zones over the poles.

One slight possibility that cannot be ruled out, the paper adds, is that radiation from the moon somehow affected the satellites taking the readings in a way to cause more sensitivity to polar than tropical readings.

The moon does not produce light but reflects the light of the sun. When the moon is full, it heats up and emits heat energy as well as light. ❑

Spewing Fountains of Gas High Above Poles Discovered

Associated Press, 22 Dec 1996, SAN FRANCISCO (cb Billy-Ace Baker)—The periodic space storms that knock out satellites and power systems may not be entirely the sun's fault after all.

Scientists say they have discovered that Earth spews fountains of electrified oxygen, nitrogen, hydrogen and helium high above its poles and that these flows may contribute to electronics-disrupting storms.

Previously, scientists thought such disturbances came only from the solar wind, the flow of charged particles streaming from the sun.

New NASA images have provided a striking first look at Earth's own gaseous flow.

From them, scientists are constructing a more complex picture in which the solar wind and terrestrial stream combine to wreak havoc, according to Thomas E. Moore, chief of the space plasma physics branch at NASA's Marshall Space Flight Center in Huntsville, Ala.

Space storms can knock out electronics on spacecraft, alter the orbits of satellites and disrupt power systems across continents. A space storm on March 13, 1989, knocked out transformers and caused problems throughout North America.

The findings were presented Monday during the American Geophysical Union fall meeting, a gathering of nearly 7,000 scientists.

Moore said the huge fountains are spewing out plasma at 100,000 mph and at a rate of 50 tons a day.

Although some of the material is pushed out and escapes into space, some is blown back toward Earth by the solar wind.

He said it supplies enough material to create the nighttime auroras, the colorful Northern Lights. ❑

Iceland Awaits Floods

***The Washington Post*, 5 Oct 1996, p. A24, REYKJAVIK, Iceland (cb Peter Barretta)**—Icelanders built sluiceways as they braced for massive flooding following a volcanic eruption under a glacier. Emergency teams were toiling around the clock on preparations to prevent the expected huge flows of water from wrecking bridges, roads and power stations.

On Wednesday the volcano smashed through the Vatnajokull glacier, which is 1,800 feet thick in some places and covers about one-tenth of Iceland, at a point about 120 miles east of Reykjavik. It spewed black clouds into the air, some five miles high, forming a sulfur-smelling tower of ash visible from most parts of Iceland. Occasional bursts of red lightning lit up the air over the six-mile-long fissure. ❑

Auroras in Daylight?

APL Scientists Solve Mystery

***The TInet report*, by Anthony Jackson, LAUREL, Md. (cb Robert Gleason)**—Does the aurora borealis, the grand "northern lights" of the night sky, also shine in daylight when it can't be seen? Researchers at The Johns Hopkins University Applied Physics Laboratory (APL), located here, have a surprising answer to that long-standing scientific question.

"Auroras have been studied for centuries, but always in darkness, when observation was possible," says APL physicist Patrick T. Newell. "It has long been assumed that auroras, like stars, are still present when the sun is up, just hidden."

Not so, according to a report by Newell and APL colleagues Ching Meng and Kevin M. Lyons. They conclude that the northern lights are present predominantly in darkness, most often between sunset and midnight, and mainly during the spring, winter and fall months of short days and long nights.

This is contrary to the belief that auroral storms usually occur symmetrically in the northern and southern hemispheres.

The APL results were based on scrutiny of more than 150 million measurements made by five U.S. Air Force weather satellites from 1983 to 1992. In order to overcome the problem of observing auroras in daylight, the researchers instead looked at beams of hot electrons from near-Earth space, which can be studied equally well in daylight or darkness. Auroras are thought to originate when those beams of high-speed charged particles from the sun interact with Earth's powerful magnetic field. ❑

Probing the Aurora

***National Science Foundation News*, 31 Oct 1996 (cb Peter Barretta)**—When the sixth Automatic Geophysical Observatory is put into place in a remote location on the Antarctic ice cap this season, it will complete a network of instruments that take continuous measurements of the aurora and the polar ionosphere (the highest layer of the earth's atmosphere). The AGOs will furnish data that could otherwise be collected only by an entire flotilla of spacecraft. ❑

About Your Annual Dues

Some clarification is needed about annual dues contributions.

For ease of administration we ask for annual dues to be submitted at the end of each calendar year and we include a dues envelope for convenience of our membership.

Since many of you send in your dues several years in advance, we tag your contributions to our membership files in our computer. This tag prints out on your membership sticker that we place on the envelope for *The Polar Times*. If it reads "expires 1297," then your membership contribution is due in 1998. If it reads "expired 1296," you are in arrears! If in doubt, send in your contributions, and we will credit your account by advancing your expiration date.

Multiple year contributions are welcome as are donations. We are a tax exempt organization as defined by Sec 501(C)3 of the IRS Code. ❑

Rising Temperatures

Date: Wednesday, 16-Apr-97 **(Source unknown). 16 Apr 97, by Peter James Spielmann (AP), SYDNEY, Australia (cb Billy-Ace Baker)**—Rising temperatures in the ocean depths off Antarctica provide new evidence that greenhouse gas emissions from the Industrial Age are causing global warming, researchers said Friday.

Most measurements of global warming have been made at or near the Earth's surface, and though they show a general trend toward warming there are wide inconsistencies in measurements, said Dr. Bill Budd of the Antarctic Cooperative Research Center.

New data from deep ocean probes in the Southern Ocean, Indian Ocean, and South Pacific corroborate the warming trend.

Indian Ocean waters tested as deep as 2,950 feet have warmed by 1 degree Fahrenheit between 1962 and 1987, said Dr. Nathan Bindoff, also from the Antarctic Research Center, based in Hobart. The Indian Ocean has risen by 1.4 inches in those 25 years just from thermal expansion.

Researchers said the warning was being driven by the "greenhouse gas effect" of heat trapped in the Earth's atmosphere, because they also found a dilution of the salty oceans in southern latitudes approaching Antarctica.

A warmer atmosphere holds more moisture, leading to increased rain and snow to mix with the oceans. Bindoff's research found that Indian Ocean waters between 1,600 and 4,900 feet deep contain more fresh water than in the past.

That effect was ascribed to global warming, but researchers were unsure whether it was manmade or part of a longer-term climatic trend toward warming after the last Ice Age.

The studies also found increasing salinity near the Equator, lending further support to greenhouse gas-driven global warming, Budd said. Near the equator, warmer temperatures cause faster evaporation, making the remaining ocean waters saltier. When water evaporates, salts and minerals are left behind.

Budd also found that the ocean data suggests that the warming effect is significant and increasing, when compared with measurements taken in the 19th and early 20th centuries and during the International Geophysical Year, 1957-58.

Those measurements found temperature changes so slight they could be statistically insignificant, Budd said. But during the 25-year span surveyed by Bindoff, the rise in temperature for that period was significant, and was significantly higher than the early studies.

Their research also added more weight to Antarctic studies in 1995, which found that about 40 percent more snow is falling on the Lambert Glacier than is being drained away, amounting to about a half-inch in extra depth.

That effect was ascribed to global warming, but researchers were unsure whether it was manmade or part of a longer-term climatic trend toward warming after the last Ice Age.

More deep-sea temperature measurements will be taken from instruments brought into Hobart this week by the *Melville*, a research ship from the Scripps Institute of Oceanography in San Diego, Calif. ❑

'Hurricanes" Sweep Across Antarctic Ocean's Floor

Benthic Storms Can Rage as Deep as Three Miles

***The Washington Times*, 29 Sept 196, p. D8, by Keay Davidson (cb Peter Barretta)**-Deep beneath the waves, torrents as powerful as a hurricane strike year-round. They're called "benthic storms."

Rotating like vast tornado funnels, these marine maelstroms sweep the ocean floor clean, as thoroughly as a teacher erasing a blackboard. They topple scientific instruments and damage communications cables, and may threaten oil-drilling platforms.

"Everybody thinks the bottom of the ocean is a very tranquil place. Well, it isn't," says Shelley Lauzon, a spokeswoman for Woods Hole Oceanographic Institution in Woods Hole, Mass.

And the deep sea's lack of tranquillity has implications for a bitter environmental debate: whether human beings should discard the planet's swelling mountains of chemical and radioactive waste in the ocean. Hardly anyone believed in benthic storms, from the Greek meaning under the water, until the 1980s. Before then, some scientists said they were physically impossible.

The ocean floor was so dense, they insisted, that water couldn't flow faster than several centimeters per second.

"When I first proposed this in 1963, the physicists and physical oceanographers said, 'This is absolute nonsense!'" recalls Woods Hole oceanographer Charles Hollister. Yet now, thanks considerably to Mr. Hollister's work, oceanographers agree that benthic storms often clobber certain subaquatic realms, where eerie fish and deep crustaceans thrive in eternal darkness.

Benthic storms are especially common in the North Atlantic (for example, south of Nova Scotia) and in Antarctica. That's because both regions "have very cold water and a tremendous amount of wind chilled on salty current," Mr. Hollister says.

Cold water is heavier than warm water, and salty water is heavier than fresh water. So cold, salty water plunges rapidly to the ocean bottom and spreads out, fueling rapid deep-sea currents. ❑

Polar Auction in London

12 April, 1997, LONDON (cb by Peter Anderson)—The Union Jack flag that explorer Sir Ernest Shackleton raised in Antarctica sold Thursday for $40,986, more than five times its pre-sale estimate.

John Levinson, a member of the American Polar Society and a ship's surgeon from Southport, Conn., made the high bid during a Christie's auction of exploration and travel artifacts. Levinson is the author of a book on the medical care of polar explorers and is a past president of the Explorer's Club in New York.

The British flag flew in Antarctica, about 100 miles from the South Pole, during Shackleton's 1907-09 expedition. Because of dwindling supplies, the three-man team was unable to reach the pole itself. "While the Union Jack flew out stiffly in the icy gale that cut us to the bone, we looked south with our powerful glasses, but could see nothing but the dead white snow plain," Shackleton wrote.

A crumpled cotton bag holding a sprig of artificial holly, which Shackleton and Capt. Robert Falcon Scott used to celebrate Christmas during a 1902 Antarctic expedition, sold for $6,520 to an anonymous buyer. ❑

Explorer of Poles Shares Her Zest for Life

***The Capital Times*, 4 Oct 1996, by Vikki Ortiz (cb John Ong)**—Ten years ago, explorer Ann Bancroft had no idea which direction her life was headed.

So she followed her compass.

Today, the same two-inch navigational device mounted on a volleyball kneepad that guided Bancroft through the Arctic and Antarctica accompanies her on trips around the United States, doing a job she loves.

"Without the compass, I'd still be out there looking for the South Pole," Bancroft said.

Instead, she sat on the floor Thursday at Northside Elementary School in Middleton, Wis., showing third-graders equipment she used to become the first woman to travel across the ice to both the North and South poles.

Since Bancroft led the first all-women team on a 660-mile dog sled trip to the South Pole in 1992, she has spoken at hundreds of schools and organizations about her experience.

"Try and imagine white in one direction, white another direction, white in every direction you go," Bancroft, 41, told about 30 children listening attentively.

In the corner of the room, 8-year-old Travis Ace closed his eyes to picture it better.

The lesson Bancroft offers is always the same: She wants people to know that their dreams are attainable—that she had her share of struggles.

With dyslexia and a shy personality, Bancroft said she looked to exploring as a way to learn.

At 10 years old, she stated talking about Antarctica, and skiing across it became a lifelong pursuit, she said.

"I learn a lot of life's lessons," Bancroft said. "I just go to the poles to get them."

Today, she decribes the intense cold, howling wind and solitude of her journey, hoping people will be inspired.

"I want them to think it's a possible thing, not an extraordinary thing," she said.

With children, the opportunity to do this reaps benefits for her as well, she said.

As she demonstrated the three layers of boots she wore on the trips to protect her feet from cold, the third-graders looked on with wide eyes.

Chris Kilcoine, 8, raised his hand and gave the type of comment that inspires Bancroft.

DAVID SANDELL/THE CAPITAL TIMES

Explorer Ann Bancroft explains some of her gear to students in Middleton.

"Ever heard of heat packs?" You shake them and they can keep you warm," he offered.

Bancroft stifled a smile.

"Kids have a tremendous optimism and thrill for life. I get swept up in that," she said. ❑

Arctic Trekker Tells of Narrow Escape

Fellow adventurers kept him warm

***The Washington Times*, 25 Mar 1997, p A13, by Robert Uhlig**—A student who went on a solo trek to the North pole recalled yesterday how he plunged through pack ice into the Arctic Ocean and saved his life by tracking down two other adventurers in the snowy wastes.

Alan Bywater, a 21-year-old computer studies student from London, was 10 days into his solo attempt to walk to the North Pole unsupported when the accident happened.

"My left leg went through the ice and my body, from the waist downwards, suddenly plunged into the ocean," he said. "I immediately thought this would be it."

But Mr. Bywater dragged himself out and back on to the ice sheet, where he discovered the sea had swallowed his equipment, including his radio and satellite navigation.

"I lost one of my two sledges immediately. It went straight down into the ocean, and my other sledge was badly smashed up," he said.

He knew that he faced certain death unless he could find the camp of two other explorers who had teamed up to trek to the North Pole—David Hempleman-Adams, a 40-year-old British businessman, and a 25-year-old Norwegian, Rune Gjeldnes.

"It took me six hours to discover their sledge track marks in the ice," Mr. Bywater said. "I was desperately cold and growing more despondent by the hour, but I knew it was my only chance of survival."

The pair was settling down for the night in their tent when they suddenly heard a shout.

"We couldn't' believe it," Mr. Hempleman-Adams reported over the radio to Base Camp in Resolute bay, In Canada's Northwest Territories. "Rune and I rushed out of the tent and helped Bywater inside."He was clearly in a bad state and in the initial stages of hypothermia."

The two men lay by either side of Mr. Bywater to keep him warm during the night and fed him soup.

"When I saw their tent, I had felt an overwhelming sense of relief," Mr. Bywater said. "But I woke up during the night and could not feel my legs at all. I was then extremely worried that I would lose my legs."

The recovery aircraft arrived the next afternoon, but bumpy pressure ridges around the tent made it impossible for it to land nearby.

While Mr. Hempleman-Adams remained inside the tent nursing Mr. Bywater, Mr. Gjeldnes spent four hours stamping out the larger bumps to create a small area flat enough to allow the Twin Otter to land.

"Rune and I emptied one of our sledges and placed Alan on it," Mr. Hempleman-Adams said. "We then hauled him over to the plane and lifted him in. He's a very lucky lad to have survived his ordeal."

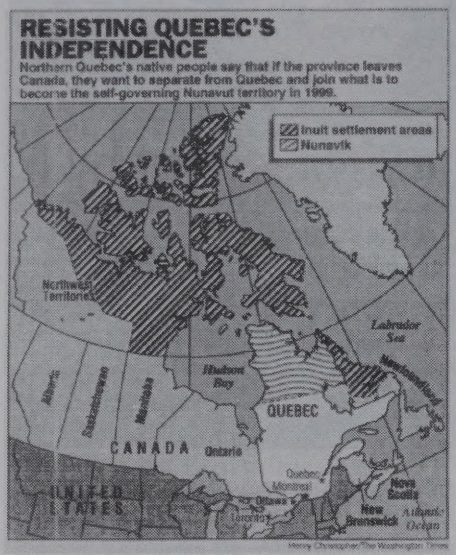
On his arrival at Resolute Bay early Sunday, Mr. Bywater was carried from the plane on a stretcher to waiting medical staff.

"I thought on more than one occasion that I would definitely die out there. I've been incredibly lucky," he said.

He has been told he will be unable to walk for two weeks and may have to have at least one toe amputated.

"Mentally, I feel fine, but I'm obviously in some discomfort from the frostbite," said Mr. Bywater, who lives with his girlfriend in Vancouver. "But I'm definitely going to attempt the walk again next year." ❑

Secession Could Split Quebec



***The Washington Times*, 5 Dec 1996, p. A12, by David Ratcliff (cb Peter Barretta)**—If Quebec votes to secede from Canada, it will face intense opposition from the aboriginal people of its Arctic regions, a native leader said yesterday.

"If Quebec separates, we will not be taking any steps to break away from anyone. Rather, we will be taking steps to remain in Canada," Zebedee Nungak told reporters before a meeting with State Department Officials.

"We cannot be pulled out of our country against our will....We will not be party to any breach of Canada's unity or any impeachment of its borders," said Mr. Nungak, the president of an economic development company, Makivik Corp.

Mr. Nungak said a "cold chill" has descended over relations between Quebec's government and the native people, who call themselves Inuits rather than Eskimos.

Negotiations among Quebec, the federal government and Inuit leaders were suspended in June 1995. Further talks were sidelined by the Oct. 30, 1995, referendum on Quebec's sovereignty.

About 8,300 Inuits live in a region of northern Quebec that they call the Nunavik Territory. Eighty-two percent of Inuit voters opposed sovereignty in the Quebec referendum.

"The whisper-thin majority by which the 'no' forces won that vote made it very up close and personal for me and my people," Mr. Nungak said. "We were at the edge of the abyss, and we have to say to the sovereigners, 'We are not coming with you on a journey toward independence.'"

In 1993, three arctic regions were joined in a land-claims settlement that provides for creation in 1999 of a self-governing territory to be named Nunavut. If Quebec leaves Canada, Mr. Nungak advocates that Nunavik be separated from Quebec and added to Nunavut.

Mr. Nungak said there can be no compromise with the separatist movement, but he dismissed fears that the Inuit stand will result in violence.

"We don't have any tradition of violence, but our objection to independence in Quebec is fundamental and intractable," he said. "We are not ever again prepared to have our political status determined yet again by somebody else.

"We are not seeking to dismantle Canada. We are proof that slowly but surely our country is capable of evolving to accommodate the needs and aspirations of its various peoples." ❑

Northern Ozone Hole Reported

(AP) 4 April 1997, GENEVA. (cb Peter Anderson)—The earth's protective ozone layer is continuing to thin over the North Pole, according to UN officials. The ozone layer was 15 to 25 percent thinner over the Arctic this March than it was in March 1996, the World Meteorological Organization reported Friday.

Ozone is an invisible gas that absorbs ultraviolet rays from the sun. Without it, health experts say people are more prone to develop cataracts and skin cancer.

The worst affected area was over the North Pole region and north central Siberia, according to the WMO. The agency blames the thinning on the abundance of man-made chlorine and bromine in the atmosphere. Efforts are under way to reduce the chemicals, released from refrigerants and spray propellants.

WMO experts predict ozone loss will peak between 2001 and 2005, if countries abide by agreements to cut back on use of the chemicals.

There has been an absence of ozone, dubbed an ozone hole, over the Antarctic during the Southern Hemisphere spring—September and October—since late 1970's. ❑

Greenland Rock Reveals New Theory in Age of Earliest Life

by Peter Barretta for The American Polar Society—An international team of scientists reported evidence that they have found the earliest signs of life on Earth, chemical signatures hidden in microscopic grains more than 3.85 billions years old.

The research team analyzed Earth's oldest known sedimentary rocks found on Akilia Island, in southwestern Greenland. In a formation known as Itsaq Gneiss Complex they discovered tiny "tar plugs" of cooked carbon material whose composition showed characteristics that "no known abiotic (nonbiological) process can explain," according to a report in the 6 Nov 1996 issue of the journal *Nature*.

The primitive creatures that could have left these traces would probably have been microorganisms with a sophisticated metabolism. They might have lived by photosynthesis, using light as an energy source, or they might have depended on chemical energy such as bacteria discovered around hot hydrothermal vents in the deep ocean. The scientists found tiny grains of a mineral called apatite, which is often produced by microorganisms. The calcium-containing mineral also makes up bones and teeth. Inside the apatite grains, researchers found carbon ratios in the range to have come from living things.

According to a report in *Nature*, one scientist believes that the new findings seem to extend the primitive life of over 3 billion years ago to the very bottom of Earth's sedimentary pile, and that crucially alters earlier views of these oldest sediments. Because of this great amount of biological activity, the results provide strong evidence of ancient life.

The scientists, however, do caution about their evidence because the telltale carbon ratio might have come from some nonbiological process that scientists don't know about. They noted some irregularities in the data that remain to be cleared up and urged careful pursuit of scientific methods. But it is concluded that it's most likely that the new results are indeed evidence for life 3.85 billion years ago.

Reference: 1. "New Theory on Age of Earliest Life," *The Washington Post*, 7 Nov 1996, p. A6-A7; and 2. "Mineral Grains May Hold Oldest Earth Life Evidence," *The Washington Times*, 7 Nov 1996, p. A6. ❑

To South Pole by Motor Car

Novel Scheme for Overcoming Difficulties of Antarctic Exploration

Belgian Explorer Thinks It Feasible

***The Cedar Grove Gazette*, 21 Dec 1905, p. 6, BRUSSELS (cb unknown)**—M. Henryck Arctowski, the Antarctic explorer, proposes to reach the hitherto unexplored regions of the South Pole by motor car. According to the reports of explorers, who have returned from the inhospitable shores of the South Polar sea, a vast field of smooth ice extends from the natural landing places of the South Polar sea, which is supposed to extend to the pole and cover the entire polar region. It is said to be like a vast frozen pond. Other explorers have been on that field, but they could not travel fast enough to complete their explorations. Captain Scott traveled over the ice for five months, but his dogs could only make 10 miles a day, and in the end he was driven back by the fear of starvation.

Mr. Arctowski has an apparently simple plan to overcome three difficulties. He has calculated that if he traveled ten times as fast as Captain Scott did, he would be able to reach the pole long before there was any danger of starvation. He proposes to do this by using motor cars, and the idea is approved as possible by Captain Scott. Mr. Shakelton and other explorers also consider the plan as feasible.

The motor car designed for polar exploration will, of course, be a very different affair from ordinary machines. The wheels, for instance, will be a foot wide, tired with leather and studded with long, protruding nails to give them a hold in the frozen snow. Under the car will run a blade shaped like a runner of a Canadian sledge, and the weight of the car will rest on that blade and not on the wheels. The idea is approved by the Belgian Motor club and experts are now designing the car and deliberating on the character and arrangement of the fuel.

Mr. Arctowski is confident that the project will result as a notable success. Whether the precise center of the polar region is discovered or not, much is expected from the expedition in the way of increasing our knowledge of the world's geography and physical characteristics. (See *Belgica*, page 3.) ❑

Navy Submarine Has Science Duty in Arctic Ocean

***Orange County Register*, by Gary Robbins, SAN DIEGO (cb Billy-Ace Baker)**—In the dark waters of the Arctic, thick daggers of ice hang deep enough to rip apart Jim Reilly's steel cocoon if he is careless for even a heartbeat.

Reilly is the commander of the *USS Pogy*, a nuclear attack submarine that's preparing to leave San Diego this week for a rare and risky science expedition under the Arctic ice pack.

The La Habra, Calif., native will guide a crew of 120 sailors and seven civilian scientists beneath sea ice that covers poorly charted waters from which there is no quick escape.

The trip is the second of five expeditions in which the Navy is helping scientists study pollution, weather and plant life in the Arctic, the Earth's least-understood ocean.

In some areas, Reilly will have to navigate his submerged 292-foot boat around moving icebergs.

In the Bering Strait, Reilly will have to slip the 4,800-ton *Pogy* between a thick sheet of ice and the ocean floor, with only 30 feet of wiggle room.

"The Arctic is so dangerous our subs rarely go there now that the Cold War with Russia has faded," says retired navy Capt. Jim Bush of the Center for Defense Information, a think tank in Washington, D.C.

"Maneuver wrong and you could get icebound, killing everyone on board."

The Navy took the unusual step of releasing the approximate route and timetable the sub will follow as it ferries scientists below and through the ice to collect samples and identify currents.

As relations with Russia have warmed, the Navy has become less secretive about some missions. It went so far as to invite seven journalists to go on a sea trial aboard *Pogy* recently.

"If you'd told me on the day I joined the Navy that we'd reach this point, I probably would not have believed you," Reilly said.

The Navy is undergoing a drastic downsizing. Five years ago there were 95 attack subs; by 2000 there will be 55. The *Pogy* is among the subs scheduled to be decommissioned in 1998.

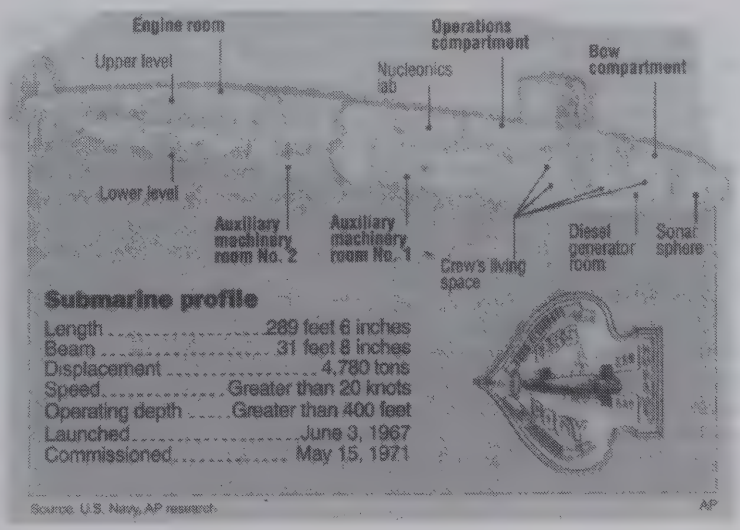
So this probably will be the only trip the *Pogy* makes into Arctic waters, a region where American subs once picked their way along the coast of Siberia, prepared to launch missiles at Russian cities.

Those patrols helped keep the peace, but they didn't produce highly accurate maps of the Arctic sea floor. Nor are there extensive maps of the bottom of the ice pack, a slow-moving, ever-changing mass whose thickness varies greatly.

In 1957, the *USS Nautilus*, among other subs, bent its periscopes while trying to dodge ice.

The *Pogy* will feel its way under the ice with a single upward-looking television camera and sophisticated sonar. The sonar listens for sounds in the ocean. And it produces crude computerized images of larger objects in the water.

The *Pogy* must pop through the ice at least 15 times to permit scientists to perform certain tasks. So the sonar crew will be looking for spots where the ice is 5 feet or thinner. The sub cannot rise through anything thicker—and there's no way to electronically communicate with the outside world when it is under the ice. If trouble develops, there's no way to ask for help. ❑



Thaw in U.S., Russia Relations Allows Release of Arctic Data

***Pensacola News Journal*, 15 Jan 1997, p. 2A, WASHINGTON (cb Billy-Ace Baker)**—Scientific knowledge about one of the least understood parts of the globe—the Arctic Ocean—took a leap forward Tuesday as information collected by U.S. and Russian military researchers was released publicly.

"Some of science's most sought-after data have come in from the cold," said Vice President Al Gore.

The first of four planned compact disks was released in ceremonies at the National Geographic Society. The disks contain millions of observations collected in the Arctic over 40 years by Russian and American researchers, largely for military purposes.

"Buried in these...observations can be found clues to the puzzle of climate change," Gore said. The release of more tan 1.3 million observations "doubles the data available on the Arctic Ocean."

During the Cold War, the Arctic was seen by both sides as a potential battleground of the future, Gore explained, so that information on its weather and oceans and ice was eagerly compiled, and just as eagerly kept secret.

But with the easing of international tensions, Gore's interests in the environment led him to ask the CIA if arctic data could be made available to scientists. Later, Gore said, he also approached Russian Prime Minister Viktor Chernomyrdin about sharing scientific data.

The result, Gore said, is the series of data disks being released for scientists to study. The first, made public Tuesday, covers the Arctic Ocean in winter. Summer ocean data will come next followed by arctic weather data and, finally, information on arctic ice cover.

About 70 percent of the data on the first disc come from the Russian archives in St. Petersburg with the rest from the United States and previously restricted international studies.

Already, scientists at the National Oceanic and Atmospheric Administration report new disclosures from the data, including a surface-to-sea floor "chimney" in which arctic water sinks to the bottom between Greenland and the northern tip of Norway.

The chimney showed up on a study of water temperatures at all depths along a line across the Arctic Ocean, forming where the chill sea floor water plunges into a deep basin north of Iceland.

It's already given us new things to think about," said James Baker, head of the National Oceanic and Atmospheric Administration. Understanding this sinking and overturning of the ocean water will help scientists increase their understanding of global change, Baker said.

Climatologist Norbert Untersteiner of the University of Washington explained that the cold water sinking in the Greenland Basin can be tracked along the floor of the Atlantic Ocean and even into the Indian Ocean, following long-distance currents.

The chimneys of sinking water are individually only a few miles wide and last only a short time, Untersteiner said, so scientists expected them to be hard to detect. But when the full set of Russian data was examined, the sinking water stood out clearly. "I was surprised," Untersteiner said.

Within the Arctic, the scientists found that water within two deep basins moves a little, but the surface water interacts with the world ocean in several areas.

While an initial version of the disk was displayed at the briefing, copies are still being prepared for distribution. The price will be $50.

WHOM TO CONTACT:

For further information on the Arctic project, contact the National Snow and Ice Data Center, CIRES, Campus Box 449, University of Colorado, Bolder, Colo. 80309-0449 or on the Internet at **http://ms.noaa.gov/atlas.** ❑

Naval Support Force Antarctica Returns to Homeport Permanently

***Navy/Marine Corps News*, 7 Mar 1997, p. 4, by JO2 Trevor Paulsen, and JOC(AW) Jacqueline Kiel (*Antarctica Sun Times*) (cb Billy-Ace Baker)**—When Naval Support Force, Antarctica (NSFA) returns to homeport this year, its long commitment to exploration of the world's most southern continent will come to an end. The 100-plus member command from Port Hueneme, Calif., has been making yearly deployments to Antarctica since Operation Deep Freeze I during the 1955—1956 austral summer season. That year, '1,800 men aboard seven ships came to Ross Island with a mission to establish an airfield and base of operations.

The Sailors of NSFA succeeded in building McMurdo Station, thereby opening up the continent for long-term scientific research. Today McMurdo is the largest settlement in Antarctica, with all of the infrastructure buildings and comforts of a small town.

In March 1998, the U.S. Air Force will replace the navy as the executive agent for the Department of Defense's logistical support role to USAP. Both U.S. Naval Support Force, Antarctica (NSFA) and the Naval Antarctic Support Unit in Christchurch, New Zealand, will decommission at that time.

The Navy will complete its transition by April 1999, when Antarctic Development Squadron SIX (VXE-6) departs the continent for the final time and decommissions. In the meantime, the navy will continue to transition its Antarctic operations.

VXE-6 will continue turning flying operations over to the NYANG (New York Air National Guard) during the next two years. The Guard will increase its presence next season, completing almost half of the flying missions. For their final season, VXE-6 will only augment the Guard, much the same as the Guard is augmenting VXE-6 this season. VXE-6 will then decommission April 1, 1999.

The Navy's departure is a result of the DOD's decision to consolidate cold-weather operations in both the Arctic and Antarctic under the same command. As the NYANG already operates in the Arctic they were both the logical and economical choice.

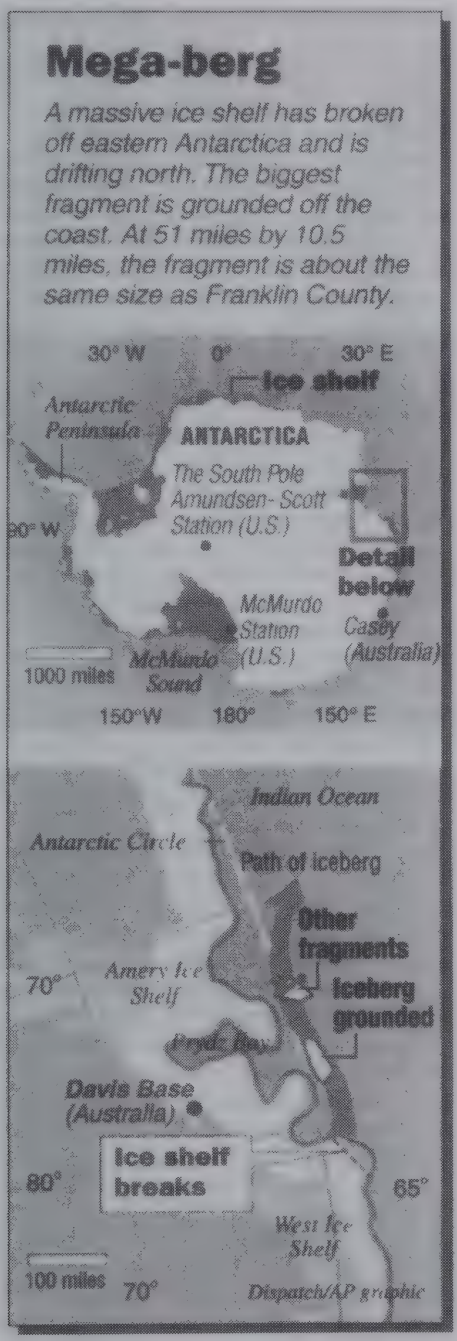
Additionally, the transfer is expected to provide a cost-savings to the National Science Foundation.

This transfer will mark the end of U.S. Navy support on the continent that began in 1928 when Admiral Richard E. Byrd first established Little America at the Bay of Whales and made the first flight over the South Pole. (See "Leaner Budgets," p. 4) ❑

Tundra Leak

***The Fairfax (VA) Journal*, 20 Dec 1996, p. A2 (cb Peter Barretta)**—Scientists attending the American Geophysical Union's conference in San Francisco announced that carbon gasses that contribute to global warming are leaking out of the arctic tundra and into the atmosphere at a growing rate. "The tundra is putting more carbon into the atmosphere than it is sucking up," said George King of the University of Michigan. The amount of carbon stored in the tundra equals almost one-third of the total amount stored in the atmosphere. Experiments on Alaska's North Slope showed that carbon molecules are being transferred from the vegetation to the air through a network of lakes, streams and rivers. ❑

Colossal Iceberg May Last 10 Years



16 Nov 1996, SYDNEY, Australia (AP) (cb Gordon Fountain)—An iceberg the size of Rhode Island that sheared off the coast of Antarctica could drift for 10 years before it melts, a scientist said Friday.

The iceberg covered more than 1,400 square miles when it split from the coast of East Antarctica in May, said Neal Young, an Australian scientist working at the Antarctic Cooperative Research Center.

The iceberg originally was about 54 by 27 miles, Young said. The biggest fragment, about 51 by 10 ½ miles and covering about 535 square miles, is grounded off the eastern coast of Antarctica.

The huge iceberg, first observed by a research ship scouting the area, has sheer walls rising 100 to 160 feet above the water line, and an estimated depth of 1,000 feet.

The ice chunks were moving with ocean currents at speeds of about three miles a day. It may be 10 years before they drift north into warmer water and melt.

The iceberg probably grew for 50 years as a result of ice flowing out from the continental ice sheet, Young said. ❑

Ice-Cream on Ice

"Reporter's Diary: Wednesday," *The Press*, 12 Feb 1997 (cb Billy-Ace Baker)—Three British students have been awarded grants of $500,00 to shiver in Antarctica in a bid to improve the quality of ice cream. The female post-graduate researchers, who are also investigating global warming, are trying to copy anti-freeze proteins in microorganisms so that ice cream will taste better and be less lumpy. All are students at Nottingham University, which is co-funding the project with food giant Unilever, the National Environment Research Council, and the United States National Science Foundation. ❑

New South Pole Observatory Opens

Associated Press, by Peter James Spielmann, AUSTRALIA (cb Peter Anderson)—The United States and Australia opened a new remote-controlled astronomical observatory at the South Pole Thursday to peer at the stars through the crystal-clear skies at the bottom of the world

Astronomers will be able to communicate with the instruments by satellite to receive images and redirect them to observe stars, making unnecessary a human presence in the bitter cold and months of darkness.

The Automated Astrophysical Site Testing Observatory is at the U.S. Amundsen-Scott South Pole Station, 9,825 feet above sea level, where astronomy is the main scientific discipline.

Hubble's instruments are about five years less advanced than those of the new observatory.

The high polar plateau is a boon to astronomers because of the absence of turbulence, which makes stars twinkle and dulls images, and because of the darkness of the sky, which creates more detailed images.

Antarctica has the driest, clearest atmosphere on Earth, making it the best possible location for astronomical observation other than a much more expensive space-based facility such as the Hubble space telescope," Australia's environment minister, Robert Hill, said in a statement.

Hubble's instruments are about five years less advanced than those of the new observatory, University of New South Wales astrophysicist Michael Ashley said.

The new observatory has an optical telescope with a 300-mm aperture to look at bright stars, an infrared scope to peer through dust and gas clouds in space, and a scope with a wavelength of less than a millimeter to monitor radiation from the Big Bang.

Infrared and submillimeter astronomy have the potential to answer basic questions about the formation of the universe, the stars and the planets, as well as the nature of primeval galaxies and the uneven distribution of matter and energy in the universe.

The subfreezing temperatures of Antarctica are better for infrared astronomy; the heat in the atmosphere in more temperate climates "whites out" the infrared sky.

The aim of the project is to determine the feasibility of establishing a large observatory in Antarctica.

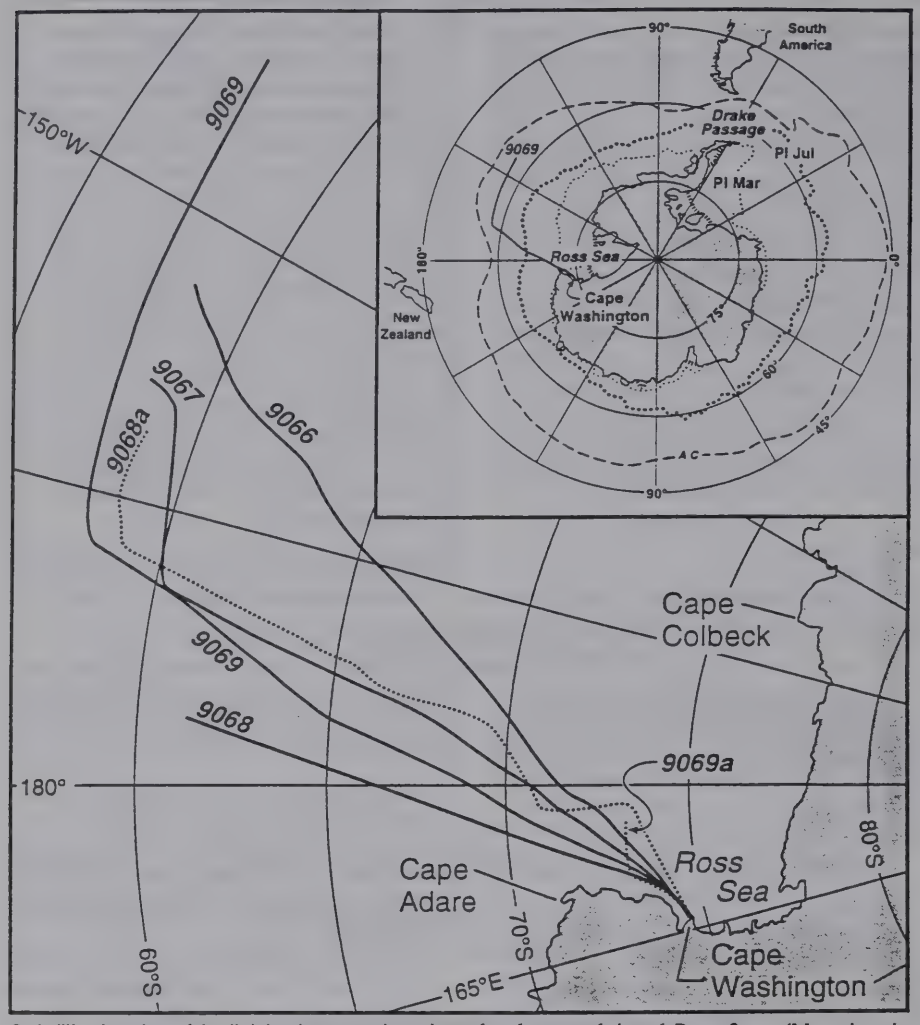
Scientists at the base will test equipment for two years to make sure that the observatory can withstand the extreme polar weather without needing human intervention.

Carnegie-Mellon University in Pittsburgh, the University of New South Wales in Sydney, and the Australian National University in Canberra will provide two instruments each for the test.

After that, the observatory — which looks like a shipping container with fiber-optic connections to telescopes — will be flown to another site 1,250 miles from the South Pole, where it will run, fully automated, for 12 months.

The data collected from this site will be transmitted by satellite to the University of New South Wales, which is coordinating the project. (See "Retrieving," page 18.) ❑

Juvenile Penguins Go Beyond Safe Area



Satellite tracks of individual penguins stray far from safety of Ross Sea. (Map by Jerry Kooyman)

***The New York Times*, 8 Oct 1996, by Les Line (cb Abel Shafer)**—Using satellite telemetry, scientists have tracked juvenile emperor penguins from their natal colony at the Ross Sea in Antarctica to distant ice-free waters in the Southern Ocean, outside of where they are protected under international agreements.

"It is disturbing to learn that emperor penguins leave the relative safety of the Ross Sea during at least one critical stage in their life cycle and range in areas that are, and will become, more heavily exploited by commercial fisheries," said Dr. Gerald L. Kooyman, a researcher at the Scripps Institute of Oceanography in San Diego.

Dr. Kooyman expressed concern that large numbers of the penguins could be caught in the nets or long lines of fishing fleets, and that stocks of the marine animals on which they feed could be overfished.

The provisions of the Antarctic Treaty and the Convention on the Conservation of Antarctic Marine Living Resources extends only to the 60th parallel in the Ross Sea region, Dr. Kooyman pointed out in a report in the current issue of the journal *Nature*. But four juvenile birds from an emperor penguin colony near Cape Washington were tracked well beyond that boundary, and one penguin was 1,775 miles from its birthplace when signals from its transmitter stopped at 56.9 degrees south latitude.

Dr. Kooyman said these findings suggested that the 60th parallel was "too limiting to adequately protect even the most familiar symbol of Antarctic wildlife, the emperor penguin." He urged that scientists investigate the dispersal patterns of Adelie and Chinstrap penguins, which also breed on the coast of Antarctica.

The satellite tracking of young emperor penguins, using small transmitters glued to the feathers on their backs, is part of a continuing study of the species by Scripps scientists. The Ross Sea birds, Dr. Kooyman said, "Are of special interest because they occur in the last marine frontier that has not been exploited by humans."

The geography of the Ross Sea, he added, provides the penguins with a safe haven, compared with birds from breeding sites on the Antarctic continent's outer perimeter. About two dozen emperor penguin colonies are known and the species breeding population is estimated at 135,000 in 175,000 pairs. The bird's numbers have declined at some colonies in recent years and disturbance from human activity, particularly helicopter flights, at nearby scientific bases, is cited as one likely cause.

The emperor is the world's largest penguin, standing nearly four feet tall and weighing as much as 90 pounds. Emperor penguins breed in the winter darkness, after the sea ice forms, gathering in colonies either on the floes or the coast. The females lay a single egg each and then spend several weeks at sea while the incubating males fast and huddle for warmth in temperatures that hover around 40 degrees below zero. The parents reunite as the southern sky starts to lighten and the eggs hatch, and over the next five months they share the duty of raising the rapidly growing chicks.

The entire breeding cycle consumes nine months. The parent birds depart to put on weight and molt shortly before their chicks fledge, leaving the 25-pound juveniles to fend for themselves. Dr. Kooyman said the adult emperor penguins travel in ice-congested polar water during the nonbreeding months, feeding on fish and squid at depths up to 1,500 feet. But the whereabouts of the juveniles and their food habits from the time they leave the colony until their return several years later are still a mystery.

Because transmitters and antennas were attached near the penguins' tails to reduce drag, satellite reception was possible only when the birds were out of the water, resting on pack ice or a drifting iceberg. The juvenile emperors left the Ross Sea colony in late December, and the researchers expected they would remain in the pack ice like the adults. The transmitter batteries would have lasted at least through June, but the last signal was received on March 6. By then, Dr. Kooyman said, the birds were in ice-free waters, where they were immersed at all times, traveling at an average rate of one mile an hour on a course that would have them circumnavigating Antarctica for the next few years.

Juvenile emperors, he added, are not as physiologically capable as the adults are, and the availability of prey that can be caught in shallower dives "may be the key as to why they go so far north." ❑

Study Backs Theory Antarctic Meteorite Hints of Life on Mars

***The New York Times*, 14 Mar 1997, p. A16, by John Noble Wilford (cb Peter Barretta)**—New chemical and magnetic studies may have turned back a serious challenge to the idea that a meteorite from Mars contains hints of past life on that planet.

In August, scientists caused a sensation with the announcement of traces of possible early Martian life found in the potato-size rock. But others raised doubts, citing evidence that the rock in question had probably been exposed to temperatures as high as 660 to 1,200 degrees Fahrenheit, too high for it to have harbored living organisms.

Two research teams, working independently, now say they have found reasons to think that the temperatures the rock was subjected to were never excessive. Their findings thus seemed to support the earlier assertion that certain tiny disk-like carbonate minerals in the meteorite could be residues formed by simple Martian organisms some four billion years ago.

The meteorite, ALH84001, is a piece of rock that crystallized in the Martian crust four and a half billion years ago and underwent a final cooling a half-billion years later. The rock then lay there more or less undisturbed until a huge asteroid or comet smashed into Mars 15 million years ago. Flung into space by the impact, the rock wandered about until 13,000 years ago, when it fell on the Antarctic ice sheet. It was one of more than a dozen Mars meteorites that geologists picked up there in the 1980s.

A combination of the rock's characteristics, including the carbonate globules and possible microbial fossils, led a team of university scientists and NASA scientists to the conclusion last year that this was evidence that perhaps life existed in an early epoch of Martian history, when the planet was warmer and wetter.

The scientists conducting the new studies, reported in the journal *Science* today, emphasized that their work did not prove the existence of past Martian life, only that the argument of high-temperature influences on the rock appeared to be groundless, and so could not be used to disprove the possibility of life. (See companion articles in vol. 2, No. 8, pp. 3-4 and next article of this issue.) ❑

Skeptic Says Life on Mars Unlikely

Associated Press, by Matt Crenson, Science Editor, SEATTLE (cb Peter Anderson)—To find out if life once existed on Mars, a prominent scientist says NASA should launch a 15-year effort to retrieve and analyze rocks from the red planet — looking for three key ingredients that would provide proof.

Geochemist John Kerridge of the University of California, San Diego is an outspoken skeptic of the theory that traces of ancient microbes are present in a meteorite from the Mars. It will take much more than a four-pound rock from Antarctica to prove that, he said Friday.

"The quality of the evidence is going to depend very, very strongly on whether we can identify the right rocks and bring them back," Kerridge said in Seattle at the annual meeting of the American Association for the Advancement of Science.

NASA researchers announced in August that they'd found signs of life in a meteorite known as ALH 84001, discovered in Antarctica 13 years ago. They pointed to a number of chemicals in the rock that can be produced by bacteria, as well as the presence of unusual microscopic shapes that could be interpreted as fossilized microbes.

At no time, however, did the group ever claim to have discovered proof of life on Mars, said Chris Romanek, a researcher at the University of Georgia and a member of the NASA team.

"We have not found life on another planet," Romanek said.

Kerridge said that he would need to see three things in a Martian rock to be convinced that alien microbes had once lived in it:

Chemicals. There are certain types of carbon-containing molecules that could only be produced by living organisms. The NASA team claimed that the presence of one class of carbon-containing molecule in the Martian meteorite, known as the PAHs, is a possible sign of life. But Kerridge said he'd be much more convinced by larger molecules made of long chains of carbon atoms.

Fossils. The strange microscopic blobs found in the Martian meteorite aren't necessarily the remains of ancient alien bacteria. The blobs could have formed through completely non-living processes, Kerridge said, and he'd like to see more convincing specimens.

Isotopes. Life preferentially absorbs some types, or isotopes, of carbon atoms from the environment. So those preferred types of carbon should be more prevalent in places where life has been than in barren rocks. In fact, Kerridge said, the oldest evidence for life on Earth is an imbalance of carbon isotopes in 3.85 billion-year-old rocks from Greenland. (See "Greenland Rock," p. 10.)

"The combination of those three would win over most skeptics, I think," Kerridge said.

To do that, Kerridge recommended sending a series of probes to Mars over the next 10 to 15 years. The first probes would scout out promising places to look for rock samples, and later missions would collect the specimens and return them to Earth.

Using such a strategy, Kerridge said, we could have the right Mars rock in our hands by 2010. He noted that NASA already has two probes on the way to the red planet — the Mars Global Surveyor and Mars Pathfinder, which is scheduled to reach its destination on July 4.

"Looking for evidence of life on Mars really makes a whole lot of sense," Kerridge said. ❑

Arctic Nations Band Against Pollution

***The Washington Times*, 20 Sept 1996, p. A16, TORONTO (cb Peter Barretta)**—Spurred by alarming reports of pollution, the eight nations that ring the arctic created a joint council yesterday to protect the fragile polar environment while encouraging long-term development.

Intended to promote cooperation in a former Cold War confrontation zone, the Arctic Council is the first forum bringing together top diplomats and polar experts from the eight nations on a regular basis.

They have some big problems to tackle—oil spills, PCB-poisoned polar bears, nuclear waste dumped by the Soviet navy. But ecological concerns will be balanced against pressure for economic and social development in the region, particularly from impoverished native groups.

Canada's foreign minister, Lloyd Axworthy, presided at the signing ceremony in Ottawa that inaugurated the council. (See "Arctic Agreement," p. 19) ❑

Studying the Photochemical Reaction in Antarctic Waters

***Hilltopics* (Washington State University), Aug 1996, by Mary Aegerter (cb Frank Mackenzie)**—The Antarctic ocean's food chain rests upon its smallest members, the phytoplankton, microscopic plants that float near the surface. Like terrestrial plants, phytoplankton manufacture their own food by photosynthesis, using sunlight to convert carbon dioxide, water and other nutrients into complex substances such as starches and proteins. They in turn are eaten by successively larger life forms, from tiny zooplankton to whales, providing as much as 90 percent of that ocean's food supply.

Yet almost nothing is known about the effects of the Antarctic's ozone hole on the phytoplankton—and even less about the effect on the rest of the food chain. A key to understanding these effects is understanding reactions between light and chemicals in the ocean—its photochemistry.

"We just don't know much about what goes on photochemically in Antarctic waters," says Washington State University professor Ken Mopper. Funded by the National Science Foundation, Mopper and his former student David Kieber, now a professor at State University of New York, are working to predict how changes in the amount of ultraviolet light will change rates of photochemical reactions in Antarctic waters.

Ozone absorbs ultraviolet light and prevents excessive amounts from reaching the earth's surface. Ultraviolet light causes sunburn, skin cancers and possibly cataracts. It also damages DNA, the genetic material of all living organisms, including phytoplankton.

Mopper's collaborators at the Smithsonian Environmental Research Center study the phytoplankton to determine how increased ultraviolet light affects them. There is evidence to suggest that photosynthesis is sensitive to ultraviolet light. It may also damage the phytoplankton's cell membranes, making the plants less able to take in nutrients, eliminate wastes or defend themselves.

Mopper looks at the effects of the ozone hole on the phytoplankton less directly by studying the environment they live in, the water. Since it is mainly ultraviolet light that causes photochemical reactions in surface waters, the amount of atmospheric ozone determine the level of photochemical reactions.

He has made two voyages to Antarctica, one during ozone hole conditions, to collect background information. "First we need to know whether these waters are different from those in the other oceans," says Mopper, "and then if so, how they are different."

While in the Antarctic, Mopper and his colleagues collect information both in coastal and open ocean sites. Samples show how far ultraviolet light penetrates into the water by indicating which photochemical reactions occur at depths down to 20 meters. "Certainly," says Mopper, "if the ultraviolet only penetrates an inch into the water, it won't have much effect on the phytoplankton."

One of the many components that they characterized is the dissolved organic matter in the surface waters. Dissolved organic matter absorbs light and captures its energy, the first step in a photochemical reaction.

However, not all organic matter absorbs ultraviolet light. In general, the organic matter in the ocean that is available as food does not. However, humic matter—less edible organic matter that has been altered by reactions in soil or water—does.

"Once we have a handle on the photochemistry of Antarctic waters, it should be possible to determine what those reactions do to the marine plankton," says Mopper. There may well be positive effects. For example, if they cause a higher rate of breakup of dissolved organic matter into food-sized pieces, increased numbers of photochemical reactions may make more food available.

"Once we can determine the effects of decreased ozone on the phytoplankton," says Mopper, "then we can look at the rest of the food chain." However, the effects on the rest of the food chain may be even more difficult to determine.

And one thing is certain. "We're likely to have an ozone hole for many, many decades," says Mopper. The CFCs (chlorofluorocarbons) that cause it have an extremely long life in the atmosphere, maybe over one hundred years. Each CFC molecule results in the destruction of hundreds of molecules of ozone during this time.

"And the ozone hole is just an extreme example of ozone depletion," says Mopper. "It's a global problem with strong evidence to show that when the ozone hole breaks up at the end of spring, there is increased ultraviolet damage to those living in Chile, Australia and New Zealand."

In addition, he says, evidence is emerging that indicates ozone depletion is occurring in other parts of the world, also. (See "Northern Ozone Hole," p. 10) ❑

Antarctica's Four Poles

***Polar Whispers*, Sept 1996/Issue 8 (cb Peter Barretta)**—How many poles are there in Antarctica? If you came up with three, that's pretty good. Excellent if you came up with the right number of four.

The Geographic South Pole, the one that all the historic struggles and hardships were over, is the southern end of the axis about which the world revolves. Situated high on the Polar Icecap at just under 3,000 meters, in the middle of a featureless polar waste, it lies close to the U.S. Scott/Amundsen Station.

The Magnetic South Pole, lying separate to the geographic pole and influencing the terrestrial magnetism of the Southern Hemisphere, was always regarded as very significant. Unlike the geographic poles, both the South and North magnetic poles are continually on the move, and each year are in slightly different positions. At the beginning of October 1908, during Shackleton's expedition, Douglas Mawson, Edgeworth David and Forbes Mackay reached the magnetic pole on the margin of the Polar Plateau on 16 January 1909. The pole has moved on since then and is now at sea off the Australian Antarctic coast.

The Antarctic Pole of Inaccessibility is the furthest point from all the Antarctic coasts and is situated on the Polar Icecap in the middle of Wilkes Land. The icecap is higher here than at the geographic pole, and the Russian Vostok Station was built close by.

The South Geomagnetic Pole is the least known. It is the pole calculated from the Earth's magnetic field, which for some unknown reason, doesn't happen to coincide with the actual South Magnetic Pole (or the point towards which compass needles point once Antarctica is approached), but lies a great distance from it in Wilkes Land. ❑

Ex-Antarctic Sailor Joins the Penguin Family

Staff photo by JO2 David Rush

Baker shows off "the stick," passed down like a baton between numerous radiomen stationed at McMurdo.

***Gosport*, 31 Jan 1997, by JO2 David Rush**—As most of us know, the Navy is not just a job, it's an adventure. For some, that's an understatement. For one Pensacola resident, retired RMC Billy-Ace Penguin Baker, who spent 32 years in the Navy, Antarctica was the place to spend a lot of it. Operation Deep Freeze was his calling.

For years he would hold the claim to fame as the only American to winter-over four times, in 1963, 1967, 1971 and 1975. In addition, Baker spent four summers there from 1976 to 1980.

Since then, several people may have surpassed this milestone; but according to Baker, this was not his goal. He volunteered to return time and again for his desire to be where he felt comfortable.

"It makes you feel like you're home," Baker said ponderously. "You either love it or you hate it. I established long-term relationships with people I met down there, and I still keep in touch with friends I met from the first time I wintered-over."

According to Baker, that was more than 30 years ago—1963, actually. Upon his first arrival to the frozen shores where McMurdo Station became home to hundreds of sailors, Baker found his ideal setting. "I was interested in Antarctica itself. It's like a passion."

Having wintered-over more times than most, Baker knows a lot about the icy continent and its few inhabitants.

His final departure from Antarctica was in 1980 and, according to Baker, that was the last time for him. "It used to be like an old frontier town, but it's too modern now. There's too much tourism. What bothers me the most is that the Navy is pulling out. It's now a civilian operation. It's like I've been violated. It was my ice. My Antarctica," Baker exclaimed.

All in all, Baker reflects on his experience with a smile. "It was the most rewarding duty I ever had, and the best duty I ever had."

In commemoration of his time on The Ice, Baker altered his name in July 1996, legally adding "penguin" to his name. Initially Baker requested permission to wear a tuxedo at the proceeding, but the request was denied.

Using his ingenuity, however, Baker donned his "Director of Penguin Affairs" nametag for the name change hearing, and thus became a proud member of the penguin family. ❑

Arctic-Like Ocean Found on Jupiter Moon

***U.S. News & World Report*, 21 Apr 1996, by Traci Watson**—The last time a new ocean was officially "discovered," the year was 1513 and the body of water was the Pacific. Last week, gleeful scientists reported another new ocean—this one on Europa, one of the moons of Jupiter. The discovery suggests the possibility that life once existed—or may still exist—on Europa.

The evidence of a large sea on Europa comes from the spacecraft Galileo, which sent back pictures that looked like the Arctic Ocean during a spring thaw: icebergs that seem to have broken into chunks and drifted apart. The best explanation for this is that a bed of water lies beneath the ice, but scientists disagree over whether liquid water remains on Europa. If it does, the water probably came from ice melted either by radioactivity inside Europa or by Jupiter's king-sized gravitational pull. A liquid ocean on Europa would make it one of the top candidates for harboring living creatures. Luckily, Galileo is running so well that its working life will be extended to include a long, close look at Europa starting at the end of the year. ❑

President Signs Environmental Protocol to Antarctic Treaty

***Antarctic Sun Times On-Line*, 27 Oct 1996, by NSF Public Affairs (cb Billy-Ace Baker)**—On Oct. 1, President Clinton signed into law H.R. 3060, the Protocol on Environmental Protection to the Antarctic Treaty. The United States, along with the other 25 consultative nations to the Antarctic Treaty, signed the protocol and five annexes in October 1991.

The Senate gave its advice and consent to ratification in October 1992, and the Administration and Congress have been working since then to develop legislation to implement the protocol.

The new law provides clear authority to implement the protocol's environmental impact assessment procedures for Antarctic activities.

It also conserves flora and fauna, addresses waste management and disposal, and has provisions for area protection and management.

"We are very pleased with the passage and signing of the legislation," said Cornelius Sullivan, director of the National Science Foundation's Office of Polar Programs. "The law protects the environment of Antarctica, safeguards scientists' ability to carry out their studies of this natural laboratory, and promotes the principle of responsible stewardship for those who travel to this unique place on Earth."

"We're pleased with the leadership of the House Science Committee and the Senate Commerce Committee in developing and actively supporting this legislation," said Joel Widder, deputy director for legislative and public affairs at the National Science Foundation.

Although the U.S. Antarctic Program already complies with the law's environmental provisions, the bill's passage and signing by the President lends the force of law to such protection and designates specific responsibilities for federal agencies to enforce the protocol.

All 26 consultative nations must ratify the protocol to put it into force. The U.S. passage of enforcing legislation is expected to spur the remaining non-ratifying nations—Belgium, Finland, India, Japan and Russia—to action. ❑

Close Quarters Make for Challenge

***The Washington Times*, 10 Feb 1997, p.A10, by William Heath (AP), USHUAIA, Argentina (cb Peter Anderson)**—The hardest part of living on Antarctica is learning to get along with your companions, says the soldier who pioneered Argentina's explorations of the white continent.

Former army Brig. Gen. Jorge Leal, the 75-year-old director of Argentina's Antarctic Department, has spent most of his adult life on Antarctica or working with researchers based there.

Leal founded Esperanza Base, one of his country's six permanent Antarctic bases, in 1952, and he led Argentina's first overland expedition to the South Pole in 1965.

"I was a young captain of mountain troops in 1951 when I became interested in Antarctica and applied to serve there," Leal said in an interview in Ushuaia, the world's southernmost city where he addressed à Rotary International conference on the Antarctic.

The application was approved and Leal spent 2 1/2 years in Antarctica, founding Esperanza Base and then commanding San Martin Base, both on the Antarctic Peninsula.

In Antarctica the most difficult part is not the cold or the loneliness, or the wind or the snow-covered ice crevasses," he said. "The hard part is learning to live with your companions. It was that way then, and I think it still must be now although scientific and technological advances have made it much easier to live there."

He was cheered by the 1991 Madrid Protocol, which banned oil and gas exploration, mining and all other irreversible exploitation in Antarctica for at least 50 years.

Among the research now being conducted on the continent is on carbon dioxide and the greenhouse effect," which many scientists believe is causing the Earth's atmosphere to heat up.

Leal is already convinced it is happening, saying he has personally observed the effect on Antarctica where "the glaciers have shrunk since 1952."

"It is terrible what man is doing to his space ship," Leal said. "But I believe that if humanity realizes the damage and destruction we are causing, measures will be taken to stop it and repair the damage some way."

Leal's eyes sparkle when he recalls his experiences. He retired from the army in 1973 and since 1989 has headed the Antarctic Department, which administers and finances scientific research on the continent.

"For me, nothing involving Antarctica is work," he said. ❑

Russian Reindeer Starving to Death

***The New York Times*, 24 Dec 1996, p. A4, MOSCOW (AP) (cb Peter Barretta)**—The weather has been frightful, making for a rough Christmas season this year for Russia's reindeer.

An estimated 10,000 of them have died of starvation in the Chukchi Peninsula in the far northeast in recent weeks, and the toll could eventually reach as high as 30,000, Russian officials said today.

After unseasonably warm weather and heavy rains last month, the temperatures on the peninsula, across the Bering Strait from Alaska, dropped sharply to 40 degrees below zero. A thick ice crust formed over many pastures, making it impossible for the reindeer to graze.

The cold has been accompanied by hurricane-force winds, said Viktor Beltsov, a spokesman for the Russian Ministry for Emergency Situations in Moscow.

The region has about 240,000 reindeer, and herdsmen have driven about 60,000 of them off to distant pastures in search of grazing areas that are not frozen, Mr. Beltsov said. ❑

Deicing Dynamics of Sea Life

***National Science Foundation News*, 31 Oct 1996 (cb Peter Barretta)**—The growth and retreat of sea ice around Antarctica is one of the world's great seasonal events, yet little is known about how ice dynamics affect zooplankton and other animals in the ocean's topmost waters (the upper 100 meters). Three cruises in the Wedell Sea and associated studies, under a project led by Kenneth Smith of the Scripps Institution of Oceanography, will track the ecology of tiny animals—zooplankton (floating) and micronekton (swimming)—over one year, to capture how dramatic changes in sea-ice cover affect the animal populations. The project will develop an instrument to monior populations at different depths and will launch a remotely-operated vehicle to sample and observe animals beneath the sea ice. ❑

Retrieving the Flare Genesis Telescope

***National Science Foundation News*, 31 Oct 1996 (cb Peter Barretta)**—One of the world's largest solar telescopes circled Antarctica last year suspended from a giant balloon and, taking advantage of the 24-hour-long light, imaged sunspots and mapped associated magnetic fields which are believed to cause solar flares. The balloon was brought down above the Adelie Coast, 1,400 kilometer from McMurdo Station, but foul weather permitted only the data recorder to be retrieved. This year, the French Antarctic program will assist the U.S. by mounting a traverse to recover the balloon payload, including the $10-million telescope. (See "New South Pole," p. 13

ANTARCTIC FUR SEALS RETURN

The New York Times, pp C4, 13 May 1997 (cb Peter Barretta).

In the 19th Century, American and British sealers nearly wiped out Antarctic fur seals. But in recent years, scientists and Antarctic tourists have noticed a seal population explosion.

The result, D.A. Hodgson of the British Antarctic Survey wrote in a recent issue of *Nature*, is damage to vegetation, soil erosion and polluted freshwater lakes on the coast where seals gather.

Dr. Hodgson's research has shown that there had been seals on the island for at least 6000 years, and that they had all but disappeared during the 19th and early 20th century when sealers were active.

Dr. Hodgson says that the current seal population is at least 75 percent greater than its highest previous level. ' This evidence, Dr. Hodgson said, supports the idea that the decline .in baleen whales, which by 1965 had been reduced by an estimated 90 percent, fostered the seal boom by providing an all but unlimited source of food.

JAMES GORMAN

Ancient Humans Survived in Arctic

Made stone tools 300,000 years ago

***The Washington Times*, 28 Feb 1997, p. A10, (AP) (cb Peter Barretta)**—Primitive humans thrived in the killing cold of northern Siberia 300,000 years ago, eons sooner than once believed possible, according to new age-dating of stone tools dug from frozen tundra.

The finding means that primitive humans were clever enough to live in one of the most severe climates on Earth far earlier than most experts had thought possible, said Michael Waters of Texas A&M University, head of a field expedition to Siberia.

"Prior to this, the oldest known occupants of Siberia were about 30,000 years ago," said Mr. Waters. "Before this, it was thought that only [anatomically] modern humans could have lived there.

"It shows us that people even in that early time had the skills to deal with severe cold."

Mr. Waters said these findings are a surprise because most researchers had thought sophisticated survival skills came into wide use among ancient human-like animals only with the appearance of about 150,000 years ago of anatomically modern humans.

The Siberian site studied by Mr. Waters and his team is called Diring Yuriakh. It is located on a plateau above the Lena River, near the town of Yakutsk, just about 300 miles south of the Arctic Circle. ❑

Arctic Agreement on Nuclear Waste

***The Washington Post*, 25 Sept 1996, p. A26, BERGEN, Norway (cb Peter Barretta)**—The United States, Russia and Norway will sign an agreement Thursday to deal with nuclear waste and other toxic material that was stored or dumped in the arctic for decades by the Soviet Union.

Norway had pushed for the agreement to raise international concern about radioactive waste that has accumulated for years at its doorstep on Russia's Kola Peninsula—home to nuclear submarine bases established years ago by the Soviet Union.

Details of the agreement were not disclosed, but Norwegian officials said it would involve projects to develop prototype containers for interim storage of spent nuclear fuel and new technology for treatment of liquid as well as solid radioactive waste. (See "Arctic Nations," p. 15) ❑

Deep in the Doldrums of Alaska's Winter, a Mardi Gras for Mushers

B81.19.27/THE ANCHORAGE MUSEUM OF HISTORY AND ART

***The New York Times*, 13 Mar 1997, p. A1, by Carey Goldberg, NOME, Alaska (cb Peter Barretta)**—When the warning siren wails these days in this tiny old gold Rush town near the top of the world, people do not cringe.

Rather, the enthusiasts among them swathe themselves in fleece, down and fur—or stay in their shirt sleeves if they have enough alcohol in their system not to feel the cold—and head merrily to Front Street. For the siren alerts them to what some Alaskans consider the most exciting moments of their year: the arrival of each musher in the great test of human and husky endurance known as the Iditarod.

The first finisher reached the tree-burl arch that marks the race's end on Tuesday night. Martin Buser, a Swiss-born three-time champion, accepted the $50,000 and the new truck he had won and immediately, more sincerely than any Oscar winner, gave credit where it was due—to the dogs who had pulled him. His victory, gained by mushing more than 1,000 miles of snowy wastes in nine days, eight hours and 30 minutes, was no small achievement.

But during this, the 25th running of the most famous of sled-dog contests, much of the focus in this Iditarod-crazy state has been on the achievement of the race itself: the creation of an institution that, for all its trials—from money troubles to protests from animal rights advocates over dying dogs—looks as if it is going to last.

The race re-enacts the emergency delivery of serum to fight diphtheria in Nome in 1925. But there were never races run along the trail, which is named for the now-deserted gold-rush-era town of Iditarod—believed to be an Indian word for distant place—that it passes through.

Organizers praise the race for helping to popularize the sport of dog mushing. And among the hundreds of fans and volunteers gathered here for their piece of the Iditarod action, the race provides s sort of second Christmas, a bright point among the dregs of winter.

"You come to the Iditarod and you've arrived another winter," said Gary Hart, owner of a taxi company. In Nome that does all right in a town of 3,500 people that has only about five miles of accessible road in winter. "It gets rid of all that cabin fever that built up."

(See associated article in *Polar Times*, Vol. 2, No. 8, p. 19) ❑

Snow Geese Survive All too Well, Alarming Conservationists

***The New York Times*, 11 Feb 1997, p. C1, by Jane E. Brody**—The striking sight of thousands of snow geese flying north in waving skeins across the spring sky is an annual thrill for mid-continent birders, and it should be, too, for environmentalist, who fret constantly about threats to waterfowl survival.

Instead, the ever-growing flocks of snow geese inspire deep conservation concerns, fears that after the voracious feeders reach their summer subarctic and arctic breeding grounds, thousands of square miles of delicate tundra will be destroyed, perhaps never to come back.

Thanks to an eclectic appetite and a grain that seems more flexible if not larger than might be expected, the snow goose has been so successful at adapting to human destruction of its southern winter home that the bird now threatens its summer home.

Researchers estimate that more than three million geese, up from one million in the late 60s, spend the winter in the central states and return each summer to the shores of Hudson Bay and Foxe Basin to breed.

A team of prominent conservationists has proposed to halve the population by 2005, largely by reducing restraints on hunting throughout North America and by allowing the Inuits of Canada to gather their fill of eggs.

For the sake of the entire ecosystem—the delicate arctic vegetation and other birds and vertebrates it supports—the conservationists say they have no choice but to reduce the number of geese that are fast tearing up the tundra. And the sooner the better.

What seems to be a runaway success in conservation in the United States is fast turning into an environmental disaster where the birds nest in Canada. It is a disaster that could ultimately lead to the loss of other species, as well as the demise of countless geese and goslings.

Dr. Bruce Batt, chief biologist for Ducks Unlimited, rejected all solutions that would result in "wasting these terrific birds," he said. Instead, the group's suggestions would increase the use of snow geese for human food. The recommendations include extending hunting limits, allowing hunters to harvest three times more birds than now permitted and removing restrictions on the harvesting good eggs by the native people in Canada. ❑

High Krill Catch Limit Worries Some Biologists

***Columbia Dispatch*, 1 Nov 1996, by Peter James Spielmann, SYDNEY, Australia (cb Peter Anderson)**—The penguins, seals and whales of Antarctica survive by eating krill, and they share their food with a protein-hungry world.

Humans scoop up tons of the shrimp-like creatures each year for their own use—as fish food, fish bait and as a delicacy for seafood lovers who savor its crab-like taste.

Harvesting of krill is still unregulated in the Australian Antarctic waters of the southeast Indian Ocean. But while Antarctic nations provisionally approved setting an annual limit on fishing in these waters, the proposed limit has raised debate over whether the limit is too lax.

Under the proposal by the Australian Antarctic Division—expected to be approved Friday—the krill catch will be limited to a generous 850,000 tons a year—about seven times the amount that krill harvesters around the world take in every year.

Harvest limits on other ocean fisheries are 1.7 million tons in the South Atlantic and 500,000 tons in the southwest Indian Ocean.

Stephen Nicol, the Australian Antarctic Division's chief krill biologist, says that under the plan, fishing would be reduced or suspended if krill stocks or predator species declined.

In Japanese markets, whole frozen krill tail meat sells for $3.45 a pound, Nicol said. "They have a crab-like taste, fairly mild. They're really quite pleasant," he said.

Nicol said demand for these crustaceans will only increase as new industrial uses are found. ❑

Milestones

We are pleased to inform you that the U.S. Board on Geographic Names approved the Antarctic geographic name *Dreschhoff Peak* on January 17, 1997, for Dr. Gisela Dreschhoff.

Peak, 2,326 m, in the Wilkniss Mountains which stands on the NW side of Creagh Icefall, 0.8 mi E of Pivot Peak, Victoria Land. Named in 1997 after Gisela A.M. Dreschhoff, physicist, Space Technology Center, University of Kansas, who conducted radioactivity surveys and other field work in various parts of Antarctica for 11 field seasons, 1976-89.

Congratulations Dr. Dreschhoff, from the American Polar Society. ❑

Russian Rescue

Associated Press, 7 Jan 1997 (date approx.), SANTIAGO, Chile (cb Billy-Ace Baker)—A Russian research ship stranded in Antarctica was freed and sailed to Chile on Monday with all 62 crewmembers and passengers.

A tugboat from the Chilean navy dislodged the *Professor Khromov* from a shoal in the Neumayer Channel in the Gerlache Strait on Sunday night.

Thirty-six European tourists were transferred to another Russian boat in the area, the *Alla Tarasova*. Their nationalities were not known.

The *Professor Khromov* ran aground Sunday near the Russian Antarctic research station Bellinshauzen, a spokesman for the Russian Weather and Environment Monitoring Service said in Moscow.

The ship will be checked for possible damage and repaired if necessary in Punta Arenas, 2,150 miles south of Santiago. Divers checked the hull of the ship and reported no major damage, the navy said.

It was not immediately known what caused the ship to run aground.

BOOK REVIEW: Lessons From Polar and Space Exploration

by Brian Shoemaker

Author: Jack Stuster; Naval Institute Press, Annapolis, Maryland; 408 pp; ISBN 1-55750-749-X; $32.95

The experiences of explorers, adventurers, military personnel, scientists, and astronauts in long-duration confinement and isolation have been recorded for decades. But now, Jack Stuster (APS), a behavioral scientists working for the National Aeronautics and Space Administration and the Defense Department, has distilled this far-flung literature into a highly readable guide useful for everyone from NASA planners to submarine crews, mountain climbers, prison administrators, and even individual families.

Successes and failures culled from the diaries, logs, journals, interviews and memoirs of famous explorers like Amundsen, Byrd, Scott, Heyerdahl, Cook and Shackleton are compared and contrasted with those of shipwreck and disaster survivors, astronauts and aquanauts, POWs, adventurers and experiment subjects. Stuster's goal is to help others avoid or mitigate chronic behavioral problems that have affected human and mission performance, often with tragic consequences.

Not only will this study aid the designers of future space expeditions, its recommendations and habitability principles are also relevant to a variety of earthbound conditions, including polar and underwater exploration and habitation. In fact, nearly all human relationships that involve small groups of people living and working in confined spaces or traveling in isolated areas can benefit from this useful and entertaining study.

BOOK REVIEW: Eagle Over the Ice

by Brian Shoemaker

Authors: Christopher C. Joyner and Ethel R. Theis; University Press of New England, Hanover, New Hampshire; 320 pp.—An examination of international governance of the Antarctic continent—one of the few success stories of international cooperation as viewed through the terms of United States politics.

The sprawling landmass at our globe's southernmost extreme is the remotest, coldest, highest, driest, windiest, least inhabited, and most barren of all the world's continents. It is also the most pristine, and its special geographical and environmental character makes Antarctica important for scientific research and also influences policies intended to regulate and husband its use.

This study of America's role in developing an international regime for governance and protection of the Antarctic challenges the traditional assumption that pursuit of a state's national interest is often irreconcilable with the pursuit of global interests. Instead, Christopher C. Joyner and Ethel R. Theis suggest, by investing financial and physical resources in Antarctic research that surpass all other nations, the United States has taken a leading role in influencing the "interlocking relationship not only between political and security interests, but also among legal, scientific, environmental, and economic interests."

The experience of the United States in Antarctica, beginning with the Antarctic Treaty of 1959 and continuing to the present day, demonstrates "the importance of exercising flexibility in domestic decision making such that policy priorities can be shifted in response to international circumstances."

BOOK REVIEW: Antarctica: A Lonely Planet Travel Survival Kit

By Brian Shoemaker

Author: Jeff Rubin; Lonely Planet Publications, Oakland, California; 362 pp.; $17.95.

Antarctica, for over 200 years the domain of the sailor, explorer and scientist, has in the last 20 years been under the onslaught of a larger group of intrepid travelers—the tourist explorer. (See companion article, "Tourists," in Vol. 2, No. 8, p. 20.)

In terms of numbers, in the 1995-96 season there were over 12,000 tourists who visited the Antarctic, twice as many as scientists and other groups working on the continent. And that number is rapidly growing. To date, there has been nothing but tourist literature and books on exploration to help them along their way.

Enter Jeff Rubin. Rubin's "Lonely Planet" book is extremely well researched. The list of those he interviewed is an international "who's who" in the polar research and exploration community. The book is well written, comprehensive, yet succinct and—most important—useful.

Everything about getting there, what to take and where to go is in this book. The history, geography, science, wildlife and environment are all covered well, and there are outstanding maps of sites most likely to be visited. If you are contemplating a tourist visit to the Antarctic, buy this book! It is the only book you need take with you when you go. ❑

The American Polar Society

The American Polar Society was formed in 1934 in response to public interest in the polar regions that was generated by the Byrd and Ellsworth Expeditions of the 1920s and 1930s. A newsletter, *The Little America Times* was published during the second Byrd Antarctic Expedition (BAE II) and Ellsworth's transcontinental flight.

Copies of *The Little America Times* were circulated throughout the United States and Canada, creating a great deal of interest in exploration and field science in the polar regions and generating a demand for a continuing publication dedicated to the Arctic and the Antarctic.

In response the American Polar Society was founded in 1934 by August Howard and others interested in polar exploration and research. In 1935, largely at his own expense, Mr. Howard began publishing *The Polar Times*, a semi-annual compendium of articles about the poles, culled mostly from newspapers, magazines and scientific journals. The newsletter was distributed free to members of the society who paid annual dues of $1.

Most leading polar explorers, scientists and expedition members joined the society and *The Polar Times* has served as a chronicle of events in the polar regions since that time.

We encourage everyone to join the American Polar Society. Membership is open to all who are interested in the polar regions as well as "Old Polar Explorers" . ❑

OBITUARIES

John N. Dyer

The Institute, March 1996, p. 3 (cb by Robert Berns) — John Newton Dyer, a life fellow of the IEEE and a former radio engineer for Antarctic explorer Admiral Richard Byrd, died Jan. 5 in Shelburne, Vt., USA. He was 85.

Born in Haverhill, Md., USA, Mr. Dyer attended the Massachusetts Institute of Technology and graduated with a B.S. in electrical engineering in 1931.

From 1933 to 1935, Mr. Dyer served as chief radio engineer on Admiral Richard Byrd's second expedition to the Antarctic. When he returned to the United States, he worked as a television engineer for Columbia Broadcasting System.

During World War II, he led a group developing radar at the Radio Research Laboratory at Harvard University and later served as director of the American-British Laboratory in Malvern, England.

Mr. Dyer is survived by three daughters, Ann Songayllo of Plattsburg, N.Y., USA; Mary Parker of Coventry, Conn., USA; and Sally Deinzer of North Clarendon, Vt.; seven grandchildren; and one great-grandson.

Harry Darlington Dies; Explored Antarctic

(cb Maria Kazanowska)—Harry Darlington, III, 78, a Marshall, Va., cattle breeder who accompanied Adm. Richard E. Byrd on his 1940 expedition to the Antarctic, died Nov. 6 at the University of Virginia Medical Center in Charlottesville. He had suffered a stroke.

Mr. Darlington, who had traveled to Labrador as a teenager, was serving in the Naval Reserve when he joined Byrd's expedition. The 1,500-mile trek was undertaken to map the coast of Antarctica between the Ross Sea and the Palmer Peninsula.

Mr. Darlington returned to the Antarctic in1947, accompanied by his wife, Jennie, to participate in another expedition to map the coastline. Mrs. Darlington, one of the first women known to have traveled to the continent, later wrote a book about their adventure, "My Antarctic Honeymoon."

In addition to his wife, of Marshall, survivors include two children, Harry Darlington IV of Marshall and Cynthia Beyer of Washington; and a sister, Elaine Fowler of Gladstone, N.J.

Robert Marvel
by Billy-Ace Baker

Commanding Officer Antarctic Support Activities, Detachment Alfa Deep Freeze 1963

Commander Robert Marvel, USN (Retired), died in his sleep at Wilford Hall Medical Center, Lackland Air Force Base, San Antonio, Texas. He was 79 years old.

Commander Marvel was the Commanding Officer of Antarctic Support Activity, Detachment Alfa during Deep Freeze 1963 (DF-63). In this capacity he was responsible for the operational control of the stations and the winter-over parties at McMurdo South Pole, Byrd, Hallett and Eights stations.

CDR Marvel was originally from Center Conway, New Hampshire. He enlisted in the Navy the day after Pearl Harbor and was commissioned as an ensign the following July. He received his initial flight training and his gold wings in Pensacola, Florida. During World War II and the Korean War he flew fighters, observation, and amphibious aircraft of various designations.

Following the successful completion of DF-63, Commander Marvel was reassigned as the Commanding Officer of Naval and Marine Corps Reserve Training Centers at Augusta and Bangor, Maine.

CDR Marvel retired from the Navy on August 31, 1966. After retirement, he decided to run for U.S. Senate, but was defeated by Warren Rudman who was the former Attorney General of New Hampshire.

CDR Marvel was my first skipper the first time I wintered over in Antarctica. I consider him to be the best skipper I ever had during my 32 years in the Navy. Over the years we had lost contact with each other, but had started corresponding several years ago. He had a scheme to transport the geodesic dome at South Pole Station to McMurdo to cover Scott's Hut to help preserve the hut and to protect it from the elements. He had communicated this scheme to several organizations and, at the time of his death, was encouraging me and other shipmates to do the same.

Memorial services were held at Fort Sam Houston in San Antonio, Texas. His remains were scheduled to be scattered at sea in accordance with his wishes. Mount Marvel has been named in his honor.

Dr. Isaac M. Taylor Researcher and Scholar

***Vineyard Paper*, 8 Nov 1996 (cb Dave Bowers)**—Dr. Isaac M. "Ike" Taylor, former dean of the University of North Carolina School of Medicine, Chapel Hill, died Sunday at Massachusetts General Hospital. He was 75 years old.

Born in Morganton, N.C., he was graduated from the University of North Carolina and three years later received his medical degree (with honors) from Harvard University. He immediately moved to Massachusetts General in Boston, where he was appointed chief resident in medicine. He also served as a research fellow in biological chemistry and a fellow in medical sciences of the National Research Council, both positions at Harvard.

Dr. Taylor was granted a two-year leave of absence from his academic appointments to serve with the U.S. Navy as a medical officer during Operation Deep Freeze near the South Pole, setting up a medical dispensary at McMurdo Sound in the Antarctic.

We looked up to him not only because of his age, but because he was a gentlemanly sort, with a great sense of humor, interest in everything.

The advanced party arrived in McMurdo Sound in late December 1955. I came to know Ike even better there, as we were tent mates on the site survey tam investigating the Cape Evans area, and then again at Hut Point during the initial construction of that facility. I learned to depend on his judgment in ever so many matters. He was very good with people, an excellent communicator. He designed and then operated the station's medical facility, very effectively, but I think he contributed so well in non-medical matters, too, especially matters having to do with the morale and welfare of the troops. I believe that everyone, especially during the winter-over period, depended on him for guidance. He and Chaplain John Condit made an excellent team whose untiring efforts resulted in the highest possible level of health and spirits of all with whom they were involved.

Member of Byrd's Historic Antarctic Expedition Dies

***Montclarion*, 18 Feb 1997, p. 8 (cb Marjorie Fountain)**-Funeral services for Gordon H. Fountain of Oakland, a prominent Bay Area sailor and one of the last surviving members of Admiral Byrd's expeditions to Antarctica, were held Feb. 21 at the Berkeley Yacht Club. Mr. Fountain, 84, died of heart failure Feb. 8.

His life spanned an amazing career that began as a young sailor on Byrd's second expedition, which involved establishing a permanent base, called "Little America." Mr. Fountain was assigned to the explorer's refitted barkentine cutter, the *Bear of Oakland*, which carried men and provisions between New Zealand and the South Pole from 1933 to 1935 (Byrd had purchased the vessel from the City of Oakland). He served as sailor, sled dog driver and cook during his two-year stint with Byrd.

A native of Los Angeles, Mr. Fountain spent his teenage years growing up in New England and sailing small boats around Martha's Vineyard. He graduated from high school and immediately joined Byrd and his team.

Mr. Fountain settled in Oakland after returning from the South Pole and went to work for a family business, the Besler Corporation. Mr. Fountain had a knack for mechanical engineering, was a skilled sailor and had flown small planes since age 15.

His keen interest in sailing involved him in the restoration of two of San Francisco's most famous vessels, the *Balclutha* and the *C.A. Thayer*, both of which are berthed at Fisherman's Wharf as part of the San Francisco Maritime Museum. He also helped repair vintage airplanes at the Western Aerospace Museum at Oakland Airport. Mr. Fountain was a flying instructor at Laney College and College of Alameda.

He was a member of the Berkeley Yacht Club, the Explorers Club of Northern California, the Aircraft Owners and Pilots Association, the OX5 Aviation Pioneers, and was a charter member of the American Polar Society. He was a longtime leader for the Air Scouts.

Mr. Fountain is survived by his wife, Marjorie; a son, Graeme Fountain of Leesburg, Virginia; and a sister, Marjorie Crane of Jamesburg, N.J.

His ashes were scattered over the Pacific over the Pacific Ocean by a formation of five aircraft from Aircraft Pilots of the Bay Area.

Charles Gallagher

Associated Press, by Peter James Spielmann, SYDNEY, Australia (cb Billy-Ace Baker)—As winter darkness settles over Antarctica, American researchers in isolated McMurdo Station mourned a colleague who died of heart failure Thursday - two days before an attempt to fly him out.

Researcher Charles Gallagher, 50, had suffered for days from pneumonia , dehydration and fluid buildup around his heart, McMurdo staff told The Associated Press via e-mail.

Gallagher, a U.S. Navy retiree who was in charge of recreational activities at McMurdo, was the 48th American staffer to die in Antarctica since 1955. Nearly all the other deaths were due to accidents.

The U.S. Air Force had been preparing for a rare and risky winter airlift Saturday to bring Gallagher out for treatment. The base is a nine-hour flight from New Zealand, the closest country.

It would have been only the third such evacuation ever from McMurdo, where temperatures have dropped to -34 degrees, with a -97 wind chill factor.

Gallagher worked for Antarctic Support Associates of Englewood, Colo., the civilian company that provides support for U.S. science bases in Antarctica. He lived in Denver.

Ned A. Ostenso

***The New York Times*, 28 April 1997, p. D12**—Ned A Ostenso, a geophysicist who was assistant administrator of the Office of Oceanic and Atmospheric Research in Washington, died of cardiac arrest on April 13 at a Washington hospital. He was 66 and had lived in Washington.

Dr. Ostenso retired last year from the National Oceanic and Atmospheric Research Administration, where he had been chief scientist. Earlier he was with the Office of Naval Research and was assistant Presidential science adviser.

His research included helping determine the mass of the Antarctic ice sheet. An Antarctic mountain is named for him. He won an American Geophysical Union medal for extraordinary service and is a former President of the American Polar Society.

Besides his wife, he is survived by two sisters, Mary Ellen Jondle of Wales, Wis., and Ruth Lundeen of Edina, Minn., and a brother, Donald, of Rochester, Minn.

Robert Bruce Atwood
by Brian Shoemaker

Robert Atwood, the long-time owner and publisher of the *Anchorage Times*, architect of Alaska statehood and Member of the Board of Governors of the American Polar Society, died at home in Anchorage on January 10.

He was known as "Mr. Alaska" and for over 62 years was involved in every major issue within the state, including oil development on the Arctic North Slope, Alaska Native Claims, scientific field research, educational development, and military defense. ❑

LETTERS TO THE EDITOR

To the Editor:

We finally honed our thousands of Antarctica slides down to a manageable hour presentation, which we gave at our church last Saturday. We tried to make it educationally, as well as visually, interesting, and we emphasized your [APS Secretary Brian Shoemaker's] points about the fragility of the continent, the importance of funding and continuing research, and [the fact that] Elderhostellers are ambassadors. We thought you'd be interested in knowing that several people spoke to us afterward, and those points had really stuck in their minds.

Happy and Jim Marsh
Barneveld, N.Y. 13304

To the Editor:

I strongly support the suggestion made in the letter from Folger Athearn that you publish the membership list of the American Polar Society. Like most members, I have lost touch with many old "Antarcticans."

Robert B. Thomson
Former Chairman of New Zealand
Antarctic Research Program
Moneta, Va.

To the Editor:

I have finished reading *The Polar Times* and passed it on to my son Alan. It is the best issue yet. You are to be commended for each article and especially the way it's laid out. August would be very proud of you.

I am enclosing a small donation to the society. It's good keeping up with the news.

Rose M. Howard
wife of founder, August Howard

To the Editor:

I enjoyed the article about Mr. Passel (Vol. 2, No. 7, p. 9, Spring-Summer issue) and thought you might be interested in a tidbit about the "famous" snow cruiser that he mentions.

In the late summer of 1939 (or was it '38? Time goes by too fast!), my mother, sister and I were driving from Springfield to Boston and *crawling* along behind the snow cruiser as it traveled to Boston.

It got stuck under a railroad bridge. They carefully released air from those huge tires, one at a time, which lowered the machine just enough to get it under the tracks. I don't remember how many hours it took while we, the traveling public, sat and waited! We eventually got home to Boston, exhausted. A long day! But one I've never forgotten.

Marcia E. Root
Buzzards Bay, Mass.

To the Editor:

Quick note: I continue to enjoy *The Polar Times*. It's the only publication that gives you the news in one "hit."

Dorothy Braxton
Florey ACT 2615, Australia

To the Editor:

I haven't yet seen anything about the death at the end (well, nearly) of 1995 of Bizal Jesudason of Resolute (Cornwallis Is.). I keep in touch with Jerry Jesudason, who is running the High Arctic Exploration Services lodge on her own now.

Dear Dorothy: We are sorry to have missed this one. Bizal was certainly an icon of the north. This highlights the fact that we are dependent upon input from the membership. You are, in effect, our reporters.—Editor)

To the Editor:

My wife and I learned of the existence of your society this January, on a trip to Antarctica, while aboard the *Akademik Sergey Vavilov*. We are interested in joining, and lending support to, your organization.

Bernice Lange and John Lange
Great Neck, NY

To the Editor:

It is barely three weeks since I have returned from a most unforgettable and exciting circumnavigation of Antarctica. I wish it was the beginning and I was able to do it all over again.

Abel Shafer

To the Editor:

I have a problem! Your back cover of *Polar Times*, Vol. 2, No. 8, displays two photos. The top photo depicts a Navy R4D on a "historic first landing at the South Pole on Oct. 31, 1956." In December 1955/ January 1956 there were several landings by the VX-6 R4D at the South Pole and on one occasion, Admiral Richard E. Byrd was aboard.

Something's amiss, either a miscalled "Historic First," or a mix-up in the date.

C.L. Bekkedahl, Capt. USN (Ret.)
Westfield, N.J.

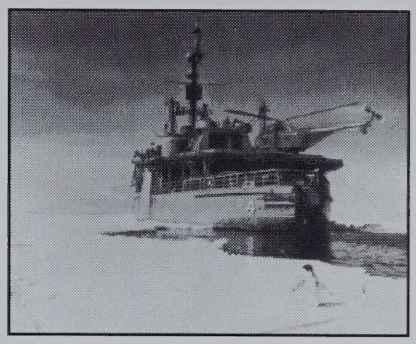
Dear Capt. Bekkedahl: We have checked our records. There were several overflights of South Pole in 1955/56, including one with Admiral Byrd, but no landings. Shinn, with Admiral Dutek aboard, was the first. There were numerous landings after their historic first.

COMMENT:

"Antarctica has about a hundred-year history, and I doubt if there is a town in America where less violence has occurred in the last century. Big Deal!" ***(Concerning FBI investigation into hammer assault incident in Antarctica, excerpted from commentary in*** **The Antarctic Society Newsletter,** ***Nov 1996, Vol 96-97, No. 2, pp. 5-6)***

The American Polar Society lapel pins were designed by our editor Della Weston. They are a work of art, with an Emperor penguin and a polar bear against a background of sun riding low on the horizon of a pale blue summer sky. This is surrounded by brass lettering of the American Polar Society set in a field of black, symbolic of the six-month winter at each of the poles. Price is $5. An order form is inside of the front cover. *Thank You!*

ANNOUNCEMENTS



USS GLACIER AGB-4 ASSOCIATION
Reunion in Myrtle Beach, S.C.—Oct. 1-5, 1997
Contact: James A. Tinch, Assoc. Pres.
901 Chestnut Street, Livingston TN 38570
1-800-483-7938, Access Code 80
or FAX 615-823-3742

***BELGICA* ANTARCTIC VOYAGE CENTENNIAL**
Ohio State University, BPRC —Sept. 5-6, 1997
Contact: Lynn Lay
Byrd Polar Research Center
Ohio State University
108 Scott Hall, 1090 Cormack Rd.
Columbus, OH 43210-1002
Ph 614-292-6715 /Fax 614-292-4697

NAVAL ARCTIC RESEARCH
LABORATORY (NARL) 50th Anniversary
Barrow, Alaska—Aug. 4-8, 1997
Contact: Glen Sheehan
P.O. Box 577, Barrow, AK 99723
Toll Free 1-888-NARL-SCI
Fax 907-852-4882

If you are planning a reunion, let us know as soon as possible so we can publish the details in a timely fashion. Better still, we will publish "inquiries of interest" in reunions, for members of polar expeditions. Then, after the celebration, we will carry an article with the details of the get-together.

(Photo contributed by Cal Larsen)

Bert Crary
Antarctic Traverse 1957

(Photo contributed by Norbert Untersteiner)

Norbert Untersteiner
Ice Station Alpha, *1957*